ANAEMIA: DIAGNOSIS AND TREATMENT OF ANAEMIA THROUGHOUT PREGNANCY, LABOUR AND POST PARTUM PERIOD – CLINICAL GUIDELINE

1. Aim/Purpose of this Guideline

1.1. The objective of this guideline is to provide health care professionals with clear and simple recommendations for the diagnosis and treatment of iron deficiency in pregnancy and the postpartum period.

1.2. The guideline gives the procedure for the administration of total dose iron.

2. The Guidance

2.1. Introduction

Iron deficiency anaemia remains a significant problem in the developed world; an estimated 30-40% of preschool children and pregnant women have iron depletion (WHO 2008). In the UK, over 90% of women who are anaemic in pregnancy, have iron deficiency anaemia. Effective management of this anaemia is essential to prevent adverse maternal and fetal outcome, and will reduce the need for allogeneic red cell transfusion.

In iron deficiency anaemia there is shortage of iron stores (low ferritin), reduced transport and functional iron (low transferrin) limiting red cell production e.g. reduced Haemoglobin (Hb).

The effects of iron deficiency anaemia on the pregnant woman may include increased susceptibility to infections, physical weakness, preterm labour, PPH, postnatal depression, low birth weight babies. The fetus is relatively protected from the effects of iron deficiency, although neonatal anaemia and impaired psychomotor development have been described. There is little information regarding the Hb threshold below which mortality increases, although this may be as high as 89 g/l, which is associated with a doubling of the maternal death risk in Britain (Brabin et al, 2001)

2.2. Definition

Anaemia is defined as Hb less than 2 standard deviations below the mean for a healthy matched population.

Anaemia is defined by

- Hb <110g/l in first trimester,
- Hb <105g/l in second / third trimester (allowing for physiological haemodilution)
- Hb <100g/l in postpartum period (British Committee for Standards in Hematology, BCSH 2011)
2.3. Diagnosis of iron deficiency

- **Clinical symptoms and signs**
  Since iron is an essential element in all cells, symptoms of iron deficiency can occur before a fall in Hb. Usually the symptoms and signs are non-specific. Fatigue is the most common symptom. Woman may complain of weakness, headache, palpitation, dizziness, dyspnoea, poor concentration and hair loss.

- **Lab tests**
  FBC (Full Blood Count) below 110g/l at booking and below 105g/l at 28 weeks indicates anaemia. There is often a low MCV (microcytic), low MCH (hypochromic) anaemia with iron deficiency, although microcytic hypochromic anaemia can also indicate haemoglobinopathies.

  - **Serum ferritin** This is the first laboratory test to become abnormal in iron deficiency and is the most useful and easily available parameter for assessing iron deficiency (< 30 microgm/ l). Serum Ferritin is not performed routinely unless there is a lack of response to (2-3 weeks) trial of oral iron, or before IV iron administration, or to assess response to treatment. Other tests like serum iron, total iron binding capacity lack sensitivity and specificity and hence are not recommended in routine diagnosis.

  - **Trial of oral iron**
    A trial of oral therapy is simultaneously diagnostic and therapeutic. If haemoglobinopathy status is unknown it is reasonable to start oral iron whilst screening is being performed. A trial of oral iron should demonstrate a rise in Hb by 2-3 weeks and confirms iron deficiency. If there has been no improvement in Hb in 2 -3 weeks referral should be made to secondary care to consider other causes of anaemia including folate deficiency.

  - **Haemoglobinopathy**
    If the woman is known to have haemoglobinopathy, ferritin should be checked first and iron started only if ferritin is < 30 ugm/l.

2.4. Management of iron deficiency

- **Antenatal**
  
  **Booking**
  If the Hb at booking is **Hb <110g/l**: Start on trial of oral Iron, Ferrous Sulphate 200mg TDS taken on an empty stomach, 1 hour before meals with a source of vitamin C such as orange juice (to increase absorption). Other medications or antacids, tea or coffee should not be taken at the same time.

  Repeat Hb levels 3 weeks after commencement of iron therapy (15-16 week appointment) and a rise in Hb should be demonstrated. If there is no rise in Hb despite good compliance, serum ferritin should be performed, Hb
electrophoresis should be considered and a referral to a Consultant Obstetrician. If a haemoglobinopathy is identified refer to joint haematology Obstetric clinic.

**Hb <90g/l:** start oral iron 200mg TDS and follow up as above. Refer to Consultant Obstetrician if symptomatic.

**Hb <70g/l:** Urgent referral to joint haematology Obstetric clinic to investigate and plan management. Do not offer blood transfusion unless symptomatic or currently bleeding. Consider total dose Iron infusion (see Appendix 3).

NB: Serum ferritin should be checked prior to starting oral iron in patients with known haemoglobinopathy.

200mg of elemental Iron/ day (200mg of Ferrous Sulphate has 65 mg of elemental iron) if taken correctly will give a rise in Hb of 20g/l every 3 weeks.

Once Hb is in normal range, treatment should be continued for a further three months.

- **28 week appointment.**
  Recheck FBC for all women.

**Hb <105g/l:** trial of oral iron as above and check for response in 3 weeks. If no response in 3 weeks check serum ferritin and refer to Consultant Obstetrician to consider total dose IV iron (Ferinject).

**Hb <90g/l:** start oral iron 200mg TDS and follow up as above. Refer to Consultant Obstetrician if symptomatic.

**Hb <70g/l:** Urgent referral to joint Haematology Obstetric Clinic to investigate and plan management. Do not offer blood transfusion unless symptomatic or currently bleeding. Consider total dose Iron infusion (Appendix 3).

- **Postnatal anaemia**
  **Hb <100g/l** is defined as anaemia in the postnatal period.

Check FBC on day 1 for all women who have had a LSCS.

Check FBC and serum Ferritin on day 1 after delivery in the following cases:
- PPH of more than 500ml
- Uncorrected anaemia in the antenatal period
- Known Iron deficiency anaemia
- Any woman with symptoms/signs suggestive of anaemia

**Hb 80-100g/l:** and are asymptomatic and haemodynamically stable should be offered elemental iron 200mg /day (Ferrous Sulphate 200mg TDS) for 3
months. Repeat FBC and ferritin after 3 weeks to ensure Hb and iron stores are replete.

**Hb <80g/l**: Treat with total dose intravenous Iron (i.e. Ferinject) followed by oral ferrous sulphate 200mg three times a day, commencing 5 days after IV Iron, for 3 months. Repeat FBC and ferritin at 10 days to ensure response and at 3 months by GP, to ensure Hb and iron stores are replete.

**Hb <70g/l**: Discuss alternatives with woman, consider 1 unit of blood following informed consent and/ or total dose IV Iron (i.e. Ferinject)

- **Symptomatic Anaemia**
  Women who are symptomatic of anaemia, haemodynamically unstable or continuing to bleed heavily will need a full senior obstetric review to investigate the origin of the blood loss and decide further management. Other speciality involvement may be indicated. Follow up arrangements with primary care should be ensured at postnatal discharge from hospital.

### 2.5. Management of labour and delivery in woman with iron deficiency

With good practice this situation should be generally avoided, however there are instances when women book late, not engaged in antenatal care, or moved from out of the county. In such situations take all measures to minimise blood loss at delivery.

- Deliver in hospital with IV access, and group and screen on admission
- Active management of third stage (refer to guidelines in management of third stage 2012)
- Consider prophylactic Syntocinon infusion / Misoprostol (Alfirevic 2007)
- In the event of a PPH, there will be a tendency to decompensate quicker, so all measures to stop bleeding should be performed promptly
- Post natal FBC and serum ferritin day 1 and iron replenishment as above

### 2.6. Parenteral Iron therapy

Is proven to increase Hb faster than oral iron and replenish iron stores faster when compared with oral iron therapy (Bhandal 2005, Wyk 2007, Breymann 2007). Fewer postpartum blood transfusions are reported in a large group treated with IV iron antenatally (Reveiz 2007).

**Ferinject** is an intravenous total dose iron preparation providing slow release of bioavailable iron for uptake by the reticuloendothelial cells and little risk of release of free iron. Hence there is no need for a test dose. An erythropoietic response is seen in a few days with an increase in reticulocyte count and ferritin level (iron store) returns to normal in 1-2 weeks. Doses of up to 1000mg iron can be administered in a single infusion.

### 2.7. Contraindication

- **PREVIOUS HYPERSENSITIVITY TO IV IRON**
- Acute infection/ inflammation
- First trimester of pregnancy

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2.8. Total dose IV Iron (Ferinject 500 mg in 10 ml vial for slow IV infusion) (New 2017).
- Antenatal infusion is based on Consultant decision
- A serum Ferritin < 30 ug/l is confirmation of iron deficiency anaemia
- If in community refer to DAU for infusion
- Administer according to prescription
- Postnatal infusions will take place either on delivery suite or wheal fortune, or if referred, in DAU
- Administer total dose iron (i.e. Ferinject) according to protocol, (Appendix 3&4)

A Test dose is NOT required for many total dose iron preparations. Risk of anaphylaxis - 1 in 10,000 cases (0.01%).

Other uncommon side effects include fast pulse, low BP and feeling dizzy.

FERINJECT
- Make up single dose infusion 500mg/1 vial of ferinject diluted with 100ml 0.9% saline via infusion at 200mls/hr over 30 minutes. Administer as per Appendix 3&4.
- Re-check Hb and serum ferritin 10 days after IV Iron dose.
- For severe iron deficiency the dose should be calculated based on target Hb to be achieved.

Expected outcome = increase Hb of as much as 20g/l in 5-7 days, 30-40g/l after 2 weeks.

3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Hb level post iron infusion</th>
<th>Adverse drug reactions</th>
<th>Patient experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Dr Aylur Rajasri, Consultant Obstetrician</td>
<td>Mr John Faulds, Blood Conservation Coordinator</td>
<td></td>
</tr>
<tr>
<td>Tool</td>
<td>Obstetric Optim Iron Database, Shared Drive 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>On Referral of each patient and follow up bloods</td>
<td>Once a month</td>
<td>Every quarter</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Maternity Guideline Group</td>
<td>Blood Conservation Team</td>
<td>Obs and Gynae Audit Forum</td>
</tr>
<tr>
<td>Acting on</td>
<td>The leads above will be responsible for undertaking any</td>
<td></td>
<td></td>
</tr>
<tr>
<td>recommendations and Lead(s)</td>
<td>recommendations following the relevant meetings.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Following the trial of this intervention, outcomes will be discussed. Where appropriate business cases will be put forward by the relevant identified leads and considered by the appropriate stakeholders.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. **Equality and Diversity**

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement.

4.2. **Equality Impact Assessment**

The Initial Equality Impact Assessment Screening Form is at Appendix 2.
### Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>ANAEMIA: DIAGNOSIS AND TREATMENT OF ANAEMIA THROUGHOUT PREGNANCY, LABOUR AND POST PARTUM PERIOD – CLINICAL GUIDELINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>20th January 2017</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>20th January 2017</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>20th January 2020</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Dr A Rajasri Obs and Gynae Directorate</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 252729</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>The objective of this guideline is to provide health care professionals with clear and simple recommendations for the diagnosis and treatment of iron deficiency in pregnancy, labour and the postpartum period. The guideline gives the procedure for the administration of total dose iron.</td>
</tr>
<tr>
<td>Suggested Keywords:</td>
<td>Anaemia, pregnancy, labour, postnatal period, postpartum, iron infusion, labour, FBC, Hb, Ferrinject, iron</td>
</tr>
<tr>
<td>Target Audience</td>
<td>RCHT PCH CFT KCCG</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>12th January 2017</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>CLINICAL GUIDELINE FOR THE DIAGNOSIS AND TREATMENT OF ANAEMIA IN PREGNANCY AND POST DELIVERY</td>
</tr>
<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>Maternity Guideline Group Obs &amp; Gynae Directorate</td>
</tr>
<tr>
<td>Divisional Manager confirming approval processes</td>
<td>Head of Midwifery</td>
</tr>
</tbody>
</table>
## Anaemia: Diagnosis And Treatment Of Anaemia Throughout Pregnancy, Labour and Post Partum Period

### Clinical Guideline

| Name and Post Title of additional signatories | Not required |
| Signature of Executive Director giving approval | {Original Copy Signed} |
| Publication Location (refer to Policy on Policies – Approvals and Ratification): | Internet & Intranet ✓ Intranet Only |
| Document Library Folder/Sub Folder | Clinical / Midwifery and Obstetrics |
| Links to key external standards | N/A |

#### Related Documents:

- UK guideline on the management of iron deficiency in pregnancy, BCSH, July 2011 Bayoumeu F, Subiran-Buisset C, Baka NE, Legagneur H, Monnier-Barbarino P, Laxenaire MC.
- Intravenous versus oral iron therapy for postpartum anaemia. BJOG 2006; 113:1248-1252 Gravier A, Descargues G, Marpeau L.

#### Training Need Identified?

No

### Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<tbody>
<tr>
<td>October 2010</td>
<td>1.0</td>
<td>Initial document</td>
<td>Dr Aylur Rajasri Consultant Obstetrician</td>
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</table>

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<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>October 2012</td>
<td>Change in product from Venofer to Monofer and change in management of HB at booking and &lt;10.5 at 28 weeks</td>
<td>Dr Aylur Rajasri Obstetrician</td>
</tr>
<tr>
<td>6th February 2014</td>
<td>Change in product name from Monofer to Ferinject only</td>
<td>Dr Aylur Rajasri Obstetrician</td>
</tr>
<tr>
<td>12th January 2017</td>
<td>Ferrinjet vial changed to 500 mg in 10 ml</td>
<td>Dr Aylur Rajasri Obstetrician</td>
</tr>
</tbody>
</table>

All or part of this document can be released under the Freedom of Information Act 2000

This document is to be retained for 10 years from the date of expiry.

This document is only valid on the day of printing

Controlled Document

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Appendix 2. Initial Equality Impact Assessment Form

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed (hereafter referred to as policy) (Provide brief description): ANAEMIA: DIAGNOSIS AND TREATMENT OF ANAEMIA THROUGHOUT PREGNANCY, LABOUR AND POST PARTUM PERIOD – CLINICAL GUIDELINE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Directorate and service area:</strong> Obs and Gynae Directorate</td>
</tr>
<tr>
<td><strong>Name of individual completing assessment:</strong> Aylur rajasri</td>
</tr>
<tr>
<td><strong>1. Policy Aim</strong></td>
</tr>
<tr>
<td><strong>Who is the strategy / policy / proposal / service function aimed at?</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>4. How will you measure the outcome?</strong></td>
</tr>
<tr>
<td><strong>5. Who is intended to benefit from the policy?</strong></td>
</tr>
<tr>
<td><strong>6a) Is consultation required with the workforce, equality groups, local interest groups etc. around this policy?</strong></td>
</tr>
<tr>
<td>*<em>b) If yes, have these <em>groups been consulted?</em></em></td>
</tr>
<tr>
<td><strong>C). Please list any groups who have been consulted about this procedure.</strong></td>
</tr>
</tbody>
</table>
### 7. The Impact

Please complete the following table.

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Rationale for Assessment / Existing Evidence</th>
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</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>X</td>
<td></td>
<td>All pregnant women</td>
</tr>
<tr>
<td><strong>Sex</strong> (male, female, trans-gender / gender reassignment)</td>
<td>X</td>
<td></td>
<td>All pregnant women</td>
</tr>
<tr>
<td><strong>Race / Ethnic communities /groups</strong></td>
<td>X</td>
<td></td>
<td>All pregnant women</td>
</tr>
<tr>
<td><strong>Disability - learning disability, physical disability, sensory impairment and mental health problems</strong></td>
<td>X</td>
<td></td>
<td>All pregnant women</td>
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<tr>
<td><strong>Religion / other beliefs</strong></td>
<td>X</td>
<td></td>
<td>All pregnant women</td>
</tr>
<tr>
<td><strong>Marriage and civil partnership</strong></td>
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<td></td>
<td>All pregnant women</td>
</tr>
<tr>
<td><strong>Pregnancy and maternity</strong></td>
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<td></td>
<td>All pregnant women</td>
</tr>
<tr>
<td><strong>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</strong></td>
<td>X</td>
<td></td>
<td>All pregnant women</td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:

- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation - this **excludes** any policies which have been identified as not requiring consultation. or
- Major service redesign or development

8. Please indicate if a full equality analysis is recommended.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>X</th>
</tr>
</thead>
</table>

9. If you are not recommending a Full Impact assessment please explain why.

N/A

Signature of policy developer / lead manager / director

Dr Aylur Rajasri
Obstetric Consultant

Date of completion and submission

20th January 2017

Names and signatures of members carrying out the Screening Assessment

1. Aylur Rajasri  
2.
Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead, C/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD.

A summary of the results will be published on the Trust’s web site.

Signed: Sarah-Jane Pedler

Date: 20th January 2017
Appendix 3

Ferinject Administration

Preparation = 500 mgs in 10 ml vial (New 2017)

- Add Ferinject dose to 100 ml of 0.9% IV Sodium Chloride
- Label
- Switch on Baxter pump and allow it to undertake its self check
- Press “OPEN” and load Baxter administration set. Once loaded it will close automatically
- Select “new patient”
- Select “Primary” administration
- Administer 500 mgs over 30 mins, set rate at 200 mls per hour
- Fully open flow-regulating clamp on administration set and press start
  - Test Dose is Not Required
- Observations (BP, HR, RR and saturation) are required prior to the start of the infusion and every 15 mins for the duration of the infusion. (See appendix 4)

Patients must stay for 30 mins following infusion and observations checked prior to discharge

- If the patient and their observations are all within normal limits the cannula can be removed and the patient discharged

Any problems please contact Blood Conservation on 8079
# Appendix 4

## Checklist for Total Dose Iron Infusion in Maternity

<table>
<thead>
<tr>
<th>Patient Identity Label</th>
<th>Name &amp; signature</th>
</tr>
</thead>
</table>

**Date:** / / 201  
**Location:** DAU / Wheal Rose / Delivery Suite / Wheal Fortune

### Antenatal patient at ……. weeks gestation / Postnatal patient

**Patient information** leaflet on IV iron given  
Verbal consent obtained

### Antenatal infusion is based on Consultant decision

Consultant authorising iron infusion: ………………………………….

### Ferritin level: <30 / Hb<80 gm%/ proven gastric intolerance to oral iron

Diagnosis of iron deficiency documented in notes

### Contraindication to parental iron therapy:
- Previous hypersensitivity to IV iron
- Acute / Infection / inflammation
- First trimester of pregnancy

No contradiction to IV iron for this patient

### Maternal observations prior to commencing iron infusion

<table>
<thead>
<tr>
<th>Temp:</th>
<th>BP:</th>
<th>Pulse:</th>
<th>Sp O2:</th>
<th>%</th>
<th>Resps:</th>
</tr>
</thead>
</table>

Fetal heart rate: bpm

### Iron Infusion

500 mg Ferrinject in 100mls 0.9% saline  
Commence infusion via Baxter pump at 200mls per hour/ Volume 100mls (30 minute infusion)  
Test dose NOT required

In exceptional circumstance for **Antenatal** patients a consultant may order 600mg or 1g to be given at 100mls/ Volume 100mls per hour

### Maternal observations after 15 minutes infusion

<table>
<thead>
<tr>
<th>Temp:</th>
<th>BP:</th>
<th>Pulse:</th>
<th>Sp O2:</th>
<th>%</th>
<th>Resps:</th>
</tr>
</thead>
</table>

Fetal heart rate

### Maternal observations after infusion complete

<table>
<thead>
<tr>
<th>Temp:</th>
<th>BP:</th>
<th>Pulse:</th>
<th>Sp O2:</th>
<th>%</th>
<th>Resps:</th>
</tr>
</thead>
</table>

Patient observed for 30 minutes after infusion complete

**Fetal well being.** CTG performed

Cannula flushed with 8mls 0.9% saline.  
Cannula removed and cannula care plan completed

Patient informed of possible side effects and advised to ensure an adult is with them overnight

### Follow up.

Blood tests for FBC, reticulocyte count and Ferritin level arranged for 10 days after iron infusion. Blood forms given to patient with clear instruction

Please refer to RCHT Clinical Guideline: Anaemia: Diagnosis and treatment of anaemia throughout pregnancy, labour and postpartum period 12th January 2017

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*Anaemia: Diagnosis And Treatment Of Anaemia Throughout Pregnancy, Labour and Post Partum Period – Clinical Guideline*