## Management of Anaemia in Primary Care Pathway

<table>
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<tr>
<th>Document type:</th>
<th>Clinical Guideline</th>
</tr>
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<tbody>
<tr>
<td>Version:</td>
<td>1</td>
</tr>
<tr>
<td>Author (name):</td>
<td>Sharran Grey¹, Helen Wright², Muhammad Athar³</td>
</tr>
</tbody>
</table>
| Author (designation): | ¹Principal Clinical Scientist/ Blood Transfusion Clinical Lead, Bolton NHS FT  
²Demand Management Programme Lead ,NHS Bolton Clinical Commissioning Group  
³General Practitioner Lead, Bolton Clinical Commissioning Group |
| Validated by:  | Bolton CCG Demand management Steering Group¹  
Bolton CCG Clinical Standards Operational Group²  
Bolton NHS FT Hospital Transfusion Committee³ |
| Date validated | 03.07.15¹, 21.08.15², 16.03.16³ |
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Version control

<table>
<thead>
<tr>
<th>Version</th>
<th>Type of Change</th>
<th>Date</th>
<th>Revisions from previous issues</th>
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<tr>
<td>1</td>
<td>New guideline</td>
<td>November 2015</td>
<td>Not applicable.</td>
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Equality Impact

Bolton NHS Foundation Trust strives to ensure equality of opportunity for all service users, local people and the workforce. As an employer and a provider of healthcare Bolton NHS FT aims to ensure that none are placed at a disadvantage as a result of its policies and procedures. This document has therefore been equality impact assessed to ensure fairness and consistency for all those covered by it regardless of their individuality. The results are shown in the Equality Impact Assessment (EIA).

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Purpose and Scope

The purpose of the pathway is to maximise identification, investigation and treatment of anaemia in primary care, ensuring GP’s have appropriate diagnostic and treatment guidance, and clear access to secondary care services and pathways (hosted on DXS Point-of-Care™). This is intended to avoid unnecessary outpatient referrals and inpatient admissions, and to ensure patients referred for elective surgery have their haemoglobin optimised. Avoidance of post-operative anaemia reduces the requirement for blood transfusion, reduces post-op morbidity and length of stay. Specifically, Iron Deficiency Anaemia (IDA) is classed as a chronic ambulatory care sensitive condition (ACSC) and the active prevention of ACSC admissions is the responsibility of the CCG.

The pathway provides a framework for current best practice in anaemia management and optimisation of patients for elective surgery, and has received expert clinical review and approval by:

Sharran Grey (Principal Clinical Scientist/Blood Transfusion Clinical Lead, Bolton NHS Foundation Trust)

Suzanne Roberts (Consultant Haematologist, Bolton NHS Foundation Trust)

Kadukkavil Padmakumar (Consultant Gastroenterologist, Bolton NHS Foundation Trust)

Muhammad Athar (General Practitioner Lead, Bolton Clinical Commissioning Group)

The pathway and guidance section of this document in held by Bolton CCG, and exists in this document controlled format for use by Bolton NHS Foundation Trust. Document review and audit will be performed jointly across both organisations.
**Anaemia Management in Primary Care**

**Primary Care**

Patient presents with suspected anaemia or for elective surgery
Clinical assessment and FBC (first line test)

**Iron Deficiency Anaemia** (Ferritin <30ug/L)

Not for elective surgery

Timing Not Critical

Trial of oral iron for four weeks
Hyperlink to Iron Deficiency guidance

Hb Normalised
- Hb females >120g/L
- Hb Males >130g/L

Hb NOT normalised
- Hb females <120g/L
- Hb Males <130g/L

**Anaemia**
Hb <130g/L (Male), Hb <120g/L (Female)
Perform 2nd line tests: repeat FBC, Retics, U&E, Creatinine, LFT, Ferritin, B12, Folate, CRP

Timing Critical

**Non-Iron Deficiency Anaemia** (Ferritin normal or raised)

For elective surgery

Hyperlink to guidance for MCV <80

Hyperlink to guidance for MCV 80-100

Hyperlink to guidance for MCV >100

IV Iron infusion
Refer to Gastroenterology for IV iron

**Red Flags Present?**
Males and Females with Dyspepsia
Postmenopausal females with GI symptoms

**Key messages** [hyperlink to general principles]

Most anaemic patients will have Iron Deficiency Anaemia, and the majority will respond to oral iron.

Patients who are to be referred for elective surgery must be screened for anaemia and their haemoglobin must be optimised prior to surgery.

Refer to appropriate secondary care specialty to investigate the underlying cause of anaemia (e.g. GI, gynaecological, haematological, renal).
**Step 1**
Establish presence of anaemia
FBC: Hb, MCV, MCH

**WHO / BCSH classification of anaemia (Hb)**
- Males: < 130 g/l
- Females: < 120 g/l
- Pregnancy: < 110 g/l (T1), < 105 g/l (T2), < 100 g/l (T3)

**Step 2**
Initial Work-Up
Repeat FBC (to exclude spurious anaemia)
Reticulocytes (blood film is automatically performed where indicated)
Ferritin, B12, Folate, U&E, creatinine, LFTs, CRP
Clinical history and examination

**Clinical history should include**
- Drug history
- Family history
- Social history inc diet, alcohol and ethnic origin

**Step 3**
Establish type of anaemia
Commence appropriate corrective therapy
Further appropriate investigation, if required, to establish cause

**Type of anaemia and any further investigation will be guided by the MCV**
(May be multifactorial)
Corrective treatment (e.g. Iron) must be commenced immediately even if definitive investigation remains outstanding

**Step 4**
Monitor response to corrective treatment
Treat cause
(Unless not in patient’s best interests)

**Red Flags**
Anaemia with abnormal blood film/ white cells/ platelets
- Refer to haematology
GI Symptoms
- Follow dyspepsia/ colorectal guidelines
**Microcytic Anaemia**

**Mean Cell Volume (MCV) < 80 fl**

- **Ferritin < 30 µg/l**
  - Iron deficiency (IDA)
  - **Hyperlink to Iron Deficiency guidance**
  - Assess for source of bleeding (including urine dipstick)
  - Refer as appropriate
    - Refer to gastroenterology (unless overt non-GI blood loss)
    - Adult male
    - Postmenopausal female
    - Premenopausal female with GI symptoms

- **Ferritin 30 µg/l – 100 µg/l**
  - Iron Studies (Iron/TIBC/Iron Saturation)

- **Ferritin > 100 µg/l**
  - Non-iron deficient microcytic anaemia or functional iron deficiency
  - Consider:
    - Non-haematological cause
      - Acute/chronic inflammation
      - Chronic infection
      - Malignancy
      - Liver disease
      - Renal failure
  - Haematological cause
    - Haemoglobinopathy eg: Thalassaemia trait
    - Sideroblastic anaemia
  - Refer to appropriate specialty

- **CRP > 30**
  - Iron <7 µ mol/L
  - Iron Saturation < 20%
  - TIBC <45µ mol/L
  - (functional iron deficiency)

- **CRP Normal/ elevated**
  - Iron >7 µ mol/L
  - Iron Saturation > 20%
  - TIBC >45µ mol/L
  - (iron replete)
Iron Deficiency

Classically presents with reduced MCV and MCH (Microcytic, hypochromic). However, in early iron deficiency and anaemia of chronic disease (where there may be a functional iron deficiency), MCV and MCH can be normal. There may also be an associated iron deficiency with chronic blood loss and haemolysis. Ferritin, B12 and folate should be assessed in all cases of anaemia, irrespective of MCV.

All patients with iron deficiency anaemia should be screened for coeliac disease with TTG antibody.

Treatment of iron deficiency anaemia
Oral replacement. 100 - 200mg elemental iron daily (e.g. 200mg bd ferrous sulphate)
- Take on an empty stomach with a glass of unsweetened orange juice
- Avoid simultaneous administration of other medications/antacids
- Ascorbic acid 500mg daily
- For nausea/ epigastric discomfort, prescribe preparation with lower iron content

Dietary advice

Parenteral iron, if
- Poor oral iron tolerance/ non-compliance
- Impaired GI absorption
- Haemodialysis
- Functional iron deficiency
- Major surgery in < 8 weeks

Transfusion

Transfusion should only be considered in cases of massive haemorrhage, imminent cardiac compromise or severe symptoms.

<table>
<thead>
<tr>
<th>Iron Salt</th>
<th>Amount</th>
<th>Ferrous Iron</th>
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</thead>
<tbody>
<tr>
<td>Fumerate</td>
<td>200mg</td>
<td>65mg</td>
</tr>
<tr>
<td>Sulphate, dried</td>
<td>200mg</td>
<td>65mg</td>
</tr>
<tr>
<td>Sulphate</td>
<td>300mg</td>
<td>60mg</td>
</tr>
<tr>
<td>Gluconate</td>
<td>300mg</td>
<td>35mg</td>
</tr>
</tbody>
</table>

Monitoring response to iron replacement
Repeat FBC after 4 weeks treatment. If improvement in Hb (10 – 20 g/l):
- Continue replacement for 2 – 4 months, then re-check Hb
- If Hb normalised, continue iron replacement for 3 months
- If no improvement, consider switch to parenteral iron
Normocytic/Normochromic Anaemia

Mean cell volume (MCV)  
80 - 100 fl

- **Isolated Anaemia**
  - Reticulocyte Count  
    - < 8 x 10\(^9\) /l
    - Blood Film
    - **Differentials:**
      - Iron deficiency
      - Mixed haematinice deficiency
      - Non-haematological cause/ anaemia of chronic disorder
      - Haematological
    - Exclude iron / functional iron deficiency
      - [Hyperlink to guidance for MCV < 80 Plus](#)
      - Review B12 and Folate result
    - Refer to haematology if remains unexplained

- **Pancytopenia**
  - Reticulocyte Count  
    - > 8 x 10\(^9\) /l
    - Bilirubin Elevated
      - Possible Haemolysis
      - Blood film
      - LDH
      - DAT (Direct Anti-globulin Test)
      - Refer to Haematology
    - Bilirubin Normal
      - Possible Bleeding
      - Investigate as indicated by history
      - Consider possible secondary iron deficiency
      - Review iron studies
      - Treat any iron deficiency whilst awaiting further investigation
      - [Hyperlink to iron deficiency guidance](#)
**Macrocytic Anaemia**

**Mean cell volume (MCV)**

>100 fl

- **Isolated Anaemia**
  - Reticulocytes > 80 x 10⁹ /L
  - Possible Haemolysis (See guidance for MCV 80 – 100 fl)

- **Pancytopenia**

- **Reticulocytes < 80 x 10⁹ /L**
  - Normal B12/ folate and Asymptomatic of B12/ folate deficiency
  - Consider:
    - Alcohol, Hypothyroidism, Drugs, Liver disease, Pregnancy
    - Haematological disorder (e.g. MDS, Myeloma)

- **Serum Folate**
  - < 3 μg/L
  - 3 – 4.5 μg/L Symptomatic
    - Ensure B12 Normal Coeliac Screen
    - Folate replacement and monitor response

- **Serum B12 (Ensure folate normal)**
  - < 170 ng/L and no symptoms re check in 2 months
  - If <170 ng/L or symptomatic
    - B12 >170 ng/L – no further investigation
    - Trial of low dose oral cobalamin
    - IF Antibody NEG
    - IF Antibody POS

- **B12 >170 ng/L, BUT strong clinical suspicion**
  - Check Intrinsic factor (IF) antibody
  - Intrinsic factor antibody positive (or negative, but with clinical response)
  - Lifelong B12 Replacement

**Date** Nov 2015

**Next Review Date**
Folate Deficiency

Macrocytic anaemia with megaloblastic changes (macrocytic red cells and hyper-segmented neutrophils seen on blood film)

Causes of folate deficiency

Dietary
Deficient diet, Alcoholism

Malabsorption
e.g. Coeliac disease, tropical sprue, IBD, jejunal resection

Excess requirements
e.g. Physiological – Pregnancy, prematurity/ infancy, Malignancy, Haemolytic anaemia (inc Sickle Cell), Inflammation (e.g. TB, Crohn’s disease)

Medication
e.g. Methotrexate, Sulfalazine, Cholestyramine, Anticonvulsants

Metabolic

Excess urinary excretion
e.g. Congestive heart failure, chronic dialysis, acute liver damage

Treatment

• Ensure vitamin B12 levels normal/ replaced to avoid development of sub-acute combined degeneration of the cord
• Dietary advice
• Folic acid 5mg daily for 4 months (may require prolonged treatment if cause persists)

Further investigation and referral

• Generally, dictated by the likely aetiology
• If history consistent with malabsorption – screen for coeliac disease (anti-transglutaminase antibodies (TTG))
• Haematology referral/advice – aetiology uncertain, suspected haematological malignancy
• Gastroenterology referral – Suspected malabsorption, positive coeliac screen
• Consider referral to dietician

Monitoring response to folate replacement

1. FBC and reticulocytes 10 days following initiation of treatment
   - Improvement in Hb
   - Reticulocyte count above normal level
2. Repeat FBC at 8 weeks and completion of treatment to ensure normalisation of Hb
Vitamin B12 Deficiency

Macrocytic anaemia with megaloblastic changes (macrocytic red cells and hyper-segmented neutrophils seen on blood film)

Causes of vitamin B12 deficiency
1. Gastric – (e.g. gastrectomy, atrophic gastritis, H. pylori)
2. Intestinal – (e.g. resection, malabsorption, ileal Crohn’s, chronic tropical sprue)
3. Dietary
4. Drugs – (e.g. colchicine, neomycin anticonvulsants, PPIs/ H2 receptor antagonists)
5. Pernicious Anaemia

Apparent vitamin B12 deficiency
1. Metformin – Check intrinsic factor antibodies if B12 levels reduced. Treat if positive or strong clinical suspicion of deficiency (with yearly B12 monitoring)
2. Pregnancy – Levels drop 30% by T3. Only treat if strong clinical suspicion of deficiency or <100 ng/L.
3. Oral contraceptives/ HRT – Only investigate further / treat if B12 < 150 ng/l or strong clinical suspicion of deficiency

Treatment
- Patients with neurological symptoms - Do not delay treatment
  Initially: 1000mcg hydroxycobalamin (IM) every 2nd day until no further improvement
  Maintenance: 1000mcg hydroxycobalamin (IM) every 2 months for life
- Patients with no neurological symptoms
  Initially: 1000mcg hydroxycobalamin (IM) 3x/ week for 2 weeks
  Maintenance for non-dietary cause: 1000mcg hydroxycobalamin (IM) every 3 months for life
- Dietary cause: 1000mcg hydroxycobalamin (IM) twice per year or 50 – 150mcg cyanocobalamin (PO) daily (vegans/ proven dietary deficiency)
  If dietary deficiency corrected, B12 can be stopped once levels normalised. Give dietary advice.

Further investigation and referral: Generally, dictated by the likely aetiology. Haematology referral/ advice – Pregnancy, Neurological symptoms, aetiology uncertain, suspected haematological malignancy. Gastroenterology referral if suspected malabsorption (other than pernicious anaemia), Pernicious anaemia with GI symptoms. Consider referral to dietician.

Monitoring response to Vitamin B12 replacement: Perform FBC and reticulocytes 10 days following initiation of treatment. Expect improvement in Hb and Reticulocyte count above normal level. Check folate if no improvement. Repeat FBC at 8 weeks and completion of treatment to ensure normalisation of Hb. Haematology advice if persistent symptoms despite replacement.
Monitoring Compliance

<table>
<thead>
<tr>
<th>Area to be monitored</th>
<th>Methodology</th>
<th>Who</th>
<th>Reported to</th>
<th>Frequency</th>
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<tr>
<td>Medical patients</td>
<td>Audit of secondary care referrals where primary cause is anaemia</td>
<td>Blood Transfusion Clinical Lead</td>
<td>Hospital Transfusion Committee</td>
<td>Every 2 years</td>
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<td>Elective surgical patients</td>
<td>Audit of pre-op anaemia, post-op morbidity and length of stay</td>
<td>Blood Transfusion Clinical Lead</td>
<td>Hospital Transfusion Committee</td>
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Appendix: References


Equality Impact Assessment

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