

## **West Midlands Regional Transfusion Committee (RTC)**

### **Guidelines for the management of anaemia in pre-operative assessment clinics**

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[www.transfusionguidelines.org.uk/index.asp?Publication=RTC&Section=28&pageid=1025](http://www.transfusionguidelines.org.uk/index.asp?Publication=RTC&Section=28&pageid=1025)

### **Disclaimer**

While the advice and information in these guidelines is believed to be true and accurate at the time of publication, neither the authors or the West Midlands Regional Transfusion Committee accept any legal responsibility for the content of these guidelines.

### **Date for guideline review**

November 2009

## **Introduction**

Blood transfusions are not without risk. The Serious Hazards of Transfusion (SHOT) has reported that the largest risk associated with allogeneic donor blood transfusion is 'incorrect blood component transfused' or 'wrong blood' incidents due to human error (Stainsby et al 2005). There is a very small risk of viral transmission, and there have to date been 4 cases of variant Creutzfeldt Jakob disease (vCJD) transmission by blood transfusion.

There are some situations when blood transfusion is essential, but for many patients this need can be reduced or avoided.

It is known that the use of blood increases in those who are anaemic pre-operatively (The West Midlands RTC 2005 and 2007, Handbook of Transfusion Medicine 2007, Scottish Intercollegiate Guidelines Network (SIGN) 2001) and that assessment of haemostasis in the pre-operative period can reduce peri-operative blood loss (Association of Anaesthetists of Great Britain and Northern Ireland 2005).

The Health Service Circular 'Better Blood Transfusion: Appropriate Use of Blood' (HSC 2002/009) recommends that pre-operative haemoglobin (Hb) levels and haemostasis are optimised in pre-operative assessment clinics (POAC) for patients with planned surgical procedures.

The 'National Good Practice Guidance on Pre-operative Assessment for Inpatient Surgery' (2002) states that pre-operative assessment should identify any condition that may require intervention prior to admission and surgery and take appropriate action.

The National Institute for Health and Clinical Excellence (2003) indicates the tests required for specific types of surgery. However, there is currently no guidance on how anaemic patients should be managed by POAC.

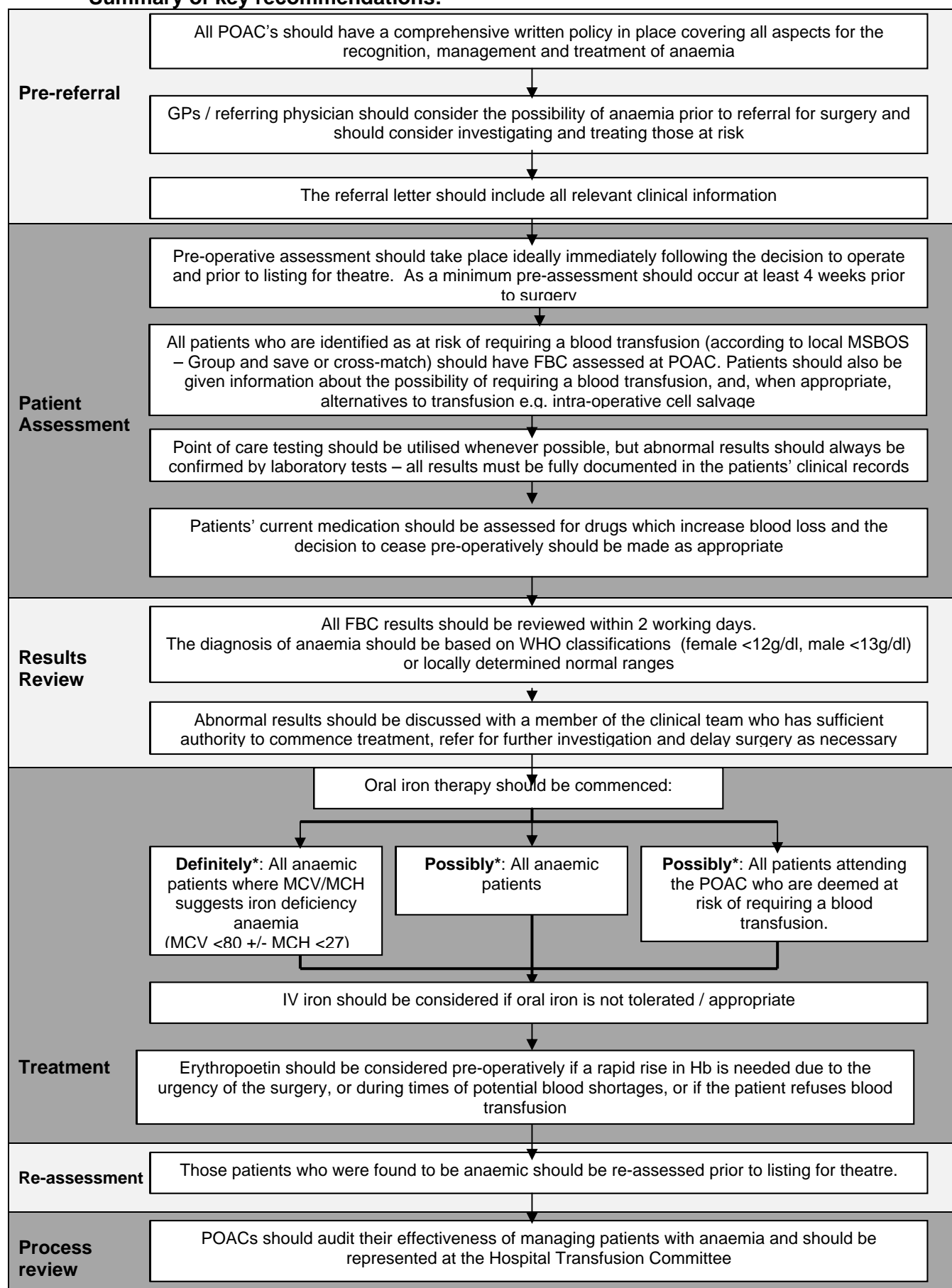
**Key to evidence statements and grades of recommendations**

The definitions of the types of evidence and the grading of recommendations used in this guideline originate from the British Committee for Standards in Haematology (BCSH) and are set out in the following tables:

Level	Description
Ia	Evidence obtained from meta-analysis of randomised controlled trials.
Ib	Evidence obtained from at least one randomised controlled trial.
IIa	Evidence obtained from at least one well-designed controlled study without randomisation.
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study.
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

Recommendation grade	Evidence
A	Requires at least one randomised controlled trial as part of a body of literature of overall good quality and consistency addressing specific recommendation. ( <i>Evidence levels Ia, Ib</i> ).
B	Requires the availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation. ( <i>Evidence levels IIa, IIb, III</i> ).
C	Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates an absence of directly applicable clinical studies of good quality. ( <i>Evidence level IV</i> ).

## Summary of key recommendations:



\* patients with known haematological conditions should be discussed with a haematologist

## Policies for managing anaemia

*Recommendation: All POAC's should have a comprehensive written policy in place covering all aspects for the recognition, management and treatment of anaemia.*

*Evidence Level: IV      Grade of recommendation: C*

### General Practitioner (GP) / Other Referring Physicians

- Ideally, local referral protocols with GP's / other referring physicians should incorporate the identification, investigation and treatment of anaemia prior to the initial surgical consultation (British Orthopaedic Association 2005).
- The referral letter should include information relating to any known or suspected history of anaemia, bleeding tendencies, coagulation problems and should include medication and any known blood results.

*Recommendation: GPs should consider the possibility of anaemia prior to referral for surgery and should consider investigating and treating those at risk. The GP referral letter should include all relevant clinical information.*

*Evidence Level: IV      Grade of recommendation: C*

### When should pre-operative assessment take place?

- The time interval between assessment and surgical procedure currently varies between specialities and POAC. Results from the West Midland RTC Pre-operative assessment Clinic audit (2005) showed variation from 1 day to 56 days.
- The diagnosis of anaemia, unrelated to the present condition, necessitates further investigation and treatment of the patient. Unnecessary delays in treatment can be avoided the sooner anaemia is diagnosed, investigated and treated.
- An initial pre-operative assessment should be performed as soon as possible. Ideally this should be done on the same day as the decision is made to operate, and at least 4 weeks before the operative date (The British Orthopaedic Association 2005). The Department of Health Better Blood Transfusion Toolkit ([www.transfusionguidelines.org.uk](http://www.transfusionguidelines.org.uk)) states that pre-operative planning should be 6 weeks prior to surgery.
- Ideally, patients should be assessed prior to joining the '18 week' waiting list. If this is not possible there should be a process in place that allows surgery to be suspended and re-scheduled should anaemia be identified, to allow treatment prior to surgery. This is supported by the Department of Health 'Tackling hospital waiting: the 18 week patient pathway' which states:
  - There will always be some patients for whom the 18 week schedule is clinically inappropriate. These rules need to cater for this.
  - In some cases ... treatment in the 18 weeks may not prove to be possible for clinical reasons. For instance, if a series of tests needs to be done in sequence, or when a second condition presents that needs to be treated first.

*Recommendation: Pre-operative assessment should take place ideally immediately following the decision to operate and prior to listing for theatre. As a minimum pre-assessment should occur at least 4 weeks prior to surgery.*

*Evidence Level: IV      Grade of recommendation: C*

### **Assessment for anaemia during pre-assessment:**

As a minimum, the following patients should be specifically assessed for anaemia:

- Patients with a history of anaemia
  - Patients who according to the MSBOS require a cross match or group and save
  - Patients with a bleeding disorder
  - Patients with chronic renal disease
  - Patients with chronic inflammatory conditions such as rheumatoid arthritis.
- 
- The Health Service Circular. Better Blood Transfusion. Appropriate Use of Blood (HSC 2002/009) states that Trusts should provide timely written information about blood transfusion and alternatives, wherever possible, to patients at risk of a blood transfusion. POACs should therefore provide this information. NHS Blood and Transplant publishes patient and parental information leaflets regarding blood transfusion ([www.blood.co.uk/hospitals](http://www.blood.co.uk/hospitals)). An example can be found in appendix 1.

*Recommendation: All patients who are identified as at risk of requiring a blood transfusion (according to local MSBOS – Group and save or cross-match) should have FBC assessed at POAC, or by referring clinician. Patients should also be given information about the possibility of requiring a blood transfusion, and, when appropriate, alternatives to transfusion e.g. intra-operative cell salvage.*

*Evidence Level: IV      Grade of recommendation: C*

### **Recognition of anaemia:**

- The World Health Organisation (2001) classifies anaemia as:

Male haemoglobin    below 13g/dl

Female haemoglobin   below 12g/dl

This is an internationally recognised definition of anaemia and should be used as the 'trigger' for further investigation and treatment in POAC's. Any locally determined normal ranges should refer to this.

- POAC's should have a system in place to ensure that the results of any investigations requested are seen, reviewed and actioned in a timely manner.
- An example investigation / results checklist can be found in appendix 2.
- FBC results should be seen, reviewed and actioned within 2 working days.
- Any abnormal results should be discussed with a member of the clinical team who has sufficient seniority to make the appropriate decisions e.g. defer surgery, refer for further investigation or treat as necessary.
- Units should have a policy in place to guide decision making, ie deferral, investigation and treatment of anaemic patients
- All assessment, investigation and treatment decisions should be clearly recorded in the patients' medical notes.

*Recommendation: Organisations should ensure they have a system in place to review all FBC results within 2 working days. Abnormal results should be discussed with a member of the clinical team who has sufficient authority to commence treatment, refer for further investigation as appropriate or delay surgery as necessary. The recognition of anaemia should be based on WHO definitions.*

*Evidence Level: IV      Grade of recommendation: C*

### **'Point of care' testing (POCT):**

- 'Point of Care' testing (POCT) allows for the immediate availability of haemoglobin results.
- In POACs where this is possible, **all** results should be permanently recorded in the patient's clinical records.

- Any abnormal results must be confirmed by the laboratory prior to commencing treatment.
- Further information can be found in BCSH Guidelines for Point of Care Testing: Haematology (2007).

*Recommendation: Point of care testing should be utilised whenever possible, but abnormal results should always be confirmed by laboratory tests – all results should be permanently recorded in the patient's clinical record.*

*Evidence Level: IV      Grade of recommendation: C*

## **Oral iron**

Oral iron should be given to:

- Definitely\*: All anaemic patients where MCV/MCH suggests iron deficiency anaemia (MCV <80 +/- MCH <27). Ferritin levels should not be reviewed prior to commencing iron therapy, as this would cause a significant time delay.
- Possibly\*: All patients who attend the pre-operative assessment clinic who are found to be anaemic (according to WHO)
- Possibly\*: All patients attending the pre-operative assessment clinic who are deemed at risk of requiring a blood transfusion (according to local MSBOS) excluding patients in whom iron therapy is contraindicated e.g. polycythaemia vera.  
\* Patients with known haematological conditions should be discussed with a haematologist.
- All patients identified with anaemia, including those where treatment with iron tablets is recommended, must be considered for further investigation unless the cause for the anaemia is already known.

Patients may receive oral iron treatment:

- Over the counter – an example patient letter can be found in appendix 3. This letter would be sent to the patient following assessment of FBC results and a decision made to commence oral iron therapy. Oral iron is currently cheaper over the counter than on prescription. Alternatively, patients may take their letter to their GP to discuss further or obtain a prescription. A GP letter should also be sent – an example can be found in appendix 4.
- Via their GP. An example GP letter can be found in appendix 5.
- Directly from the POAC, possibly utilising a patient group directive (PGD). The POAC may instigate the treatment themselves either on the day of assessment, or by recalling the patient when results are known.

Dosage:

- Generally, 400 to 600 mg/day of Ferrous Sulphate.
- Potential side effects may include gastrointestinal disturbances, which may result in poor compliance.

Patients may also be given advice about their intake of iron in their diet. An example patient information leaflet produced by NHS Blood and Transplant can be found in appendix 6.

*Recommendation: as a minimum, all patients who are anaemic (as classified by WHO) where MCV/MCH suggests iron deficiency anaemia should receive iron therapy. POACs should ensure that they have a mechanism for initiating investigation and treatment.*

*Evidence Level: IV      Grade of recommendation: C*

### **Intravenous (IV) iron**

IV iron should be considered for patients who are intolerant of oral iron, have poor iron absorption or have functional iron deficiency.

Example IV iron protocols can be found in appendix 7 and 8.

An example patient information leaflet 'intravenous iron therapy' can be found in appendix 9.

*Recommendation: IV iron should be considered if oral iron is not tolerated / appropriate.*

*Evidence Level: IV      Grade of recommendation: C*

### **Erythropoietin (EPO)**

- EPO is licensed for pre operative use in orthopaedic patients.
- EPO is a haemopoietic growth factor normally produced by the kidney in response to anaemia and low oxygen tension. It stimulates the production of red cells in the bone marrow. The use of recombinant human erythropoietin (rHuEpo) has become standard treatment for the anaemia of chronic renal failure in which endogenous EPO production is reduced by failure of kidney function.
- EPO should only be utilised when adequate iron stores are present or in conjunction with IV iron.
- EPO is particularly effective in the management of mild to moderate anaemia prior to surgery (Hb 10-13g/dl).
- The response should be monitored by weekly full blood count and reticulocyte count.

*Recommendation: EPO should be considered pre-operatively if a rapid rise in Hb is needed due to the urgency of the surgery, or during times of potential blood shortages, or if the patient refuses blood transfusion.*

*Evidence Level: IV      Grade of recommendation: C*

### **Re-assessment**

Patients who have been found to be anaemic and those patients at risk of ongoing blood loss at POAC should be re-assessed prior to listing for theatre.

*Recommendation: Organisations should have a mechanism for re-assessing the patient prior to listing for theatre, preferably pre-admission.*

*Evidence Level: IV      Grade of recommendation: C*

### **Drugs that increase blood loss**

- **Anti-platelets:** An increasing number of patients take anti-platelet agents – non-steroidal anti-inflammatory drugs, dipyridamole, aspirin and clopidogrel are all implicated in increased surgical blood loss. Ideally these drugs should be stopped prior to surgery to allow platelet function to return to normal.
- **NSAID's** provide reversible inhibition of cyclo-oxygenase, and their anti-platelet effects are half-life dependant (usually hours). Stopping NSAIDs 24 hours prior to surgery is sufficient.
- **Aspirin** leads to irreversible inhibition of platelet aggregation for the lifespan of the platelet (~10 days). The risks of peri-operative bleeding must be balanced against the risks of thromboembolic cardiovascular events. Where aspirin is stopped, this should be done 7 days before surgery to allow adequate recovery of platelet function.



- **Clopidogrel** leads to irreversible inhibition of platelet aggregation for the lifespan of the platelet (~10 days) and may cause profound bleeding. Reversal of the anti-platelet effects of clopidogrel is difficult and may require platelet transfusion. Clopidogrel is given in combination with aspirin to patients with drug eluting coronary artery stents. Cessation of clopidogrel in these patients may cause a very high risk of myocardial infarction (50% if stopped within one year of drug eluting stent (DES) insertion, with a 75% mortality rate). Clopidogrel should be stopped before intermediate or major surgery unless contraindicated. This decision must only be made in consultation with relevant medical staff. If the decision to stop clopidogrel is made, this should be done 7 days before surgery.

**CAUTION:** Discuss patients who have had coronary stent insertion with the relevant specialist consultant.

**Oral anticoagulants** (Warfarin / phenindione):

- There are three possible choices for elective surgery:
  - continuation of treatment
  - temporary discontinuation of therapy without alternative treatment
  - temporary discontinuation of therapy with alternative treatment (bridging therapy with heparin)
- Having stopped warfarin / phenindione, if the INR pre-op remains raised, small amounts of Vitamin K (1-2mg) may be given.
- **FFP is not indicated for the routine reversal of warfarin for elective surgery.**
- Refer to BCSH guidelines (1998 and 2005) and SIGN guidelines (1999) for further information.

*Recommendation: Organisations should have a policy for the management of patients taking anti-platelet or anticoagulant drugs. All decisions should be clearly recorded in the patients' medical notes.*

*Evidence Level: III      Grade of recommendation: B*

**Audit:**

- POACs should assess and monitor their effectiveness at managing patients with anaemia.
- POACs should be represented at the Hospital Transfusion Committee.

*Recommendation: POACs should audit their effectiveness at managing patients with anaemia and should be represented at the Hospital Transfusion Committee.*

*Evidence Level: IV      Grade of recommendation: C*

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## Appendix 1

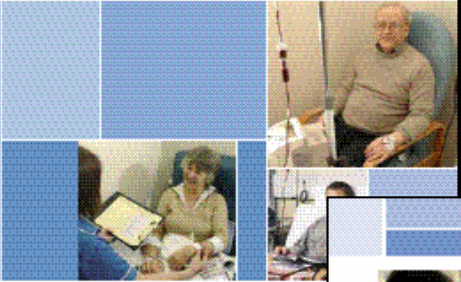
### Example patient information leaflet – 'Will I Need a Transfusion?'

This leaflet is available free of charge from NHS Blood and Transplant

[www.blood.co.uk/hospitals/library/patient\\_information\\_leaflets/leaflets/index.asp](http://www.blood.co.uk/hospitals/library/patient_information_leaflets/leaflets/index.asp)



## Will I need a blood transfusion?



**IMPORTANT PATIENT INFORMATION**

### Will I need a blood transfusion?

**IMPORTANT INFORMATION FOR ALL PATIENTS WHO MAY NEED A BLOOD TRANSFUSION**

Like all medical treatments, a blood transfusion should only be given if it is essential. Your doctor will balance the risk of you having a blood transfusion against the risk of not having one. Ask your doctor, nurse or midwife to explain why you might need a blood transfusion.

**Why might I need a blood transfusion?**

Most people can cope with losing a moderate amount of blood without needing a blood transfusion and this loss can easily be replaced with other fluids. Your body will make new red blood cells (essential for carrying oxygen throughout the body) over the following few weeks. However, if larger amounts of blood are lost, a blood transfusion may be the only way of replacing

to treat severe bleeding, for example, childbirth or in a major operation. Blood can also be used to treat severe anaemia.

**Only option?**

For a small number of patients, a blood transfusion is the only option possible to recycle blood during an operation. Ask if this is possible.

anaemia may be managed by giving a blood transfusion.

**How will I feel during my blood transfusion?**

Most people do not feel anything whilst receiving a blood transfusion.

You will be observed at regular intervals; if you begin to feel unwell during or shortly after your blood transfusion, you should inform a member of staff immediately.

Some people may develop a temperature, chills or a rash. These reactions are usually mild and are easily treated with paracetamol, or by slowing down the blood transfusion. Fortunately, severe reactions to blood are extremely rare. If they do occur, staff are trained to recognise and treat these.

**What if I have worries about receiving a blood transfusion?**

If you have any concerns you should discuss these with your doctor, nurse or midwife. Most hospitals have specialist staff working in blood transfusion and, if appropriate, they may be able to come and talk to you.

alternative treatments. You do have the right to refuse a blood transfusion, but you need to fully understand the risks of this before doing so.

Some medical treatments or operations can be carried out without a blood transfusion being given.

**What can I do to reduce the need for a blood transfusion before an operation?**

If you do not eat enough foods containing iron, your iron levels will be low. A varied and balanced diet can provide an adequate iron intake. Your blood will be checked 6-8 weeks before your operation to see if you are anaemic. A shortage of iron can cause anaemia. In good time, before your operation, you may be given iron tablets to reduce the need for a blood transfusion.

Some medicines, such as warfarin, aspirin and some anti-inflammatory drugs may increase the risk of bleeding during your operation. Always check with your doctor to find out if you should stop taking these before your operation, and when you should restart them.

**Are blood transfusions safe?**

The biggest risk from receiving a blood transfusion is being given the wrong blood.

You must be correctly identified to make sure that you get the right blood transfusion. Wearing an identification band with your correct details is essential. You will be asked to state your full name and date of birth, and the details on your identification band will be checked before each bag of blood is given.

The risk of getting hepatitis from a blood transfusion is currently about 1 in 500,000 for hepatitis B and 1 in 30 million for hepatitis C. The chance of getting HIV or HTLV infection is about 1 in 5 million. Although the risk of getting variant Creutzfeldt-Jakob Disease (vCJD) from a blood transfusion is probably low with a single blood transfusion, the risk of any infection will increase with additional blood transfusions. Each year, approximately 2 million units of blood are transfused in England and there have been just a handful of cases where patients are known to have become infected with vCJD from a blood transfusion.

**How will my blood transfusion be given?**

A blood transfusion is usually given through a tiny tube directly into a vein in the arm. Each bag of blood can take up to four hours, but can be safely given more quickly if needed. You may be given more than one bag of blood during your transfusion.

**Appendix 2**

**Example of a Pre-Operative assessment clinic investigation / result checklist**

**Pre-admission screening service  
Investigation / Follow up form**

<b>Patient details</b>	<b>TCI / Ward</b>	<b>Investigations undertaken</b>	<b>Results received</b>	<b>Problems detected / action taken</b>

Adapted from University Hospitals Birmingham NHS Foundation Trust Pre-admission screening service Investigation / Follow up form

### Appendix 3

#### Example of patient letter (Instructing patients to obtain oral iron therapy 'over the counter' / increase iron in diet)

Patient details:  
Full name:  
Date of birth  
NHS Number:  
Address:

Dear Mr / Mrs / Miss / Ms

Following your attendance at the Pre-Operative Assessment Clinic on  
It has been identified from your blood results that you have a degree of iron deficiency anaemia.

Although this condition is relatively common in the adult population, it may need further investigation by your GP.

In order to help improve this deficiency prior to your surgery, we would advise you to commence a course of oral iron tablets as detailed below. These tablets can be purchased 'over the counter' from any pharmacy (it may be easier for you to show this letter to your local pharmacist).

If you can claim for free prescriptions, your GP can prescribe these tablets for you.

Oral iron tablets: Ferrous Sulphate

Dosage:

Frequency:

Duration:

You can also help by increasing the amount of iron in your diet – the enclosed leaflet 'Iron in Your Diet' explains how.

We will inform your GP of your blood results and this advice to commence iron therapy. If you have any concerns about this – please consult with your GP.

Thank you

Signed:

Name (printed):

Date:

#### Appendix 4

#### Example of GP letter (Informing patient has been advised to obtain oral iron therapy 'over the counter' / increase iron in diet)

Patient details:  
Full name:  
Date of birth  
NHS Number:  
Address:

Dear Dr

Your patient (details above) was seen in the Pre-operative Assessment Clinic on:

Planned surgical procedure:

Planned surgery date:

Full Blood Count Results have indicated that this patient is currently anaemic.

FBC Results:

Hb

Plts

WCC

MCV MCH:

Other:

We have decided to continue with the planned surgical procedure as detailed above.

However, in order to help improve the haemoglobin prior to surgery, we have advised your patient to commence a course of oral iron tablets as detailed below:

Oral iron tablets: Ferrous Sulphate

Dosage:

Frequency:

Duration:

**NOTE: the cause of this anaemia remains unclear and may warrant further investigation by yourself.**

**Signed:**

**Name (printed):**

**Date:**

## Appendix 5

### Example of a GP letter – patient needs to be prescribed iron

Patient details:

Full name:

Date of birth

NHS Number:

Address:

Dear Dr

Your patient (details above) was seen in the Pre-operative Assessment Clinic on:

Planned surgical procedure:

Planned surgery date:

Full Blood Count Results have indicated that this patient is currently anaemic.

FBC Results:

Hb

Plts

WCC

MCV MCH:

Other:

We have decided to continue with the planned surgical procedure as detailed above.

However, in order to help improve the haemoglobin prior to surgery, we recommend that your patient should commence a course of oral iron tablets as detailed below:

Oral iron tablets: Ferrous Sulphate

Dosage:

Frequency:

Duration:

Could you please arrange for a prescription for your patient as soon as possible, as improvement of haemoglobin levels may take a number of weeks.

**NOTE: the cause of this anaemia remains unclear and may warrant further investigation by yourself.**

Thank you

**Signed:**

**Name (printed):**

**Date:**




## Appendix 6


### Example patient information leaflet – 'Iron in your diet'

This leaflet is available free of charge from NHS Blood and Transplant

[www.blood.co.uk/hospitals/library/patient\\_information\\_leaflets/leaflets/index.asp](http://www.blood.co.uk/hospitals/library/patient_information_leaflets/leaflets/index.asp)



# Iron in your diet




IMPORTANT PATIENT INFORMATION

## IMPORTANT PATIENT INFORMATION

### What can you do to boost your iron levels?

- Try to eat a well-balanced diet especially if you are pregnant or if you are waiting for an operation.
- If you know you have had low iron levels in the past, ask your doctor, nurse or midwife – they can arrange a blood test to check your haemoglobin and iron level.



Correcting a shortage of iron may reduce the chances of you needing a blood transfusion.

### Do I need to take iron tablets?

Most people should be able to get all the iron they need by eating a varied and balanced diet and should not need to take iron supplements or iron tablets.

If the level of iron in your body is very low your doctor may recommend you take a tablet containing iron.

- Iron tablets should only be taken if your doctor tells you to do so.
- Iron tablets can cause constipation or nausea in some people. Speak to your doctor if you experience side effects.

Sometimes, blood loss – for example during an operation – will result in a loss of iron.


Girls and women who have heavy periods are more at risk of low iron levels because of their monthly blood loss. Pregnancy can cause women to have low iron levels.

Young children may also have low iron levels. Please speak to your doctor or practice nurse for advice regarding iron in the diet if you have a baby or a young child.


### Which foods are good sources of iron?

A varied and balanced diet should provide an adequate iron intake. The following foods are particularly good sources of iron:

- Lean red meat
- Turkey and chicken
- It is well known that liver is rich in iron, but liver is NOT recommended for pregnant women because of its high Vitamin A content
- Fish, particularly oily fish which can be frozen or canned (such as mackerel, sardines and pilchards)



- Eggs
- Breakfast cereals – some cereals have been 'fortified' with iron
- Pulses and beans – in particular lentils, chickpeas and (nut butter)



### Wholemeal

Leafy green vegetables, especially curly kale, watercress, and dried apricots, raisins and prunes

Vitamins called ascorbic acid may help the body to get the most from the food you eat, have with meals; for example, fresh vegetables such as fresh orange juice.

Caffeine may reduce the absorption of iron from tea directly before, after or with meals between meals.

### Vegetarian or vegan?

Getting iron from non-meat sources is more difficult for the people following a well balanced diet should get enough iron in their diet. Including some of the following the advice above will also help.

Your doctor or midwife can give you further advice. You may be referred to a dietitian.

## IMPORTANT PATIENT INFORMATION

Sometimes, blood loss – for example during an operation – will result in a loss of iron.


Girls and women who have heavy periods are more at risk of low iron levels because of their monthly blood loss. Pregnancy can cause women to have low iron levels.

Young children may also have low iron levels. Please speak to your doctor or practice nurse for advice regarding iron in the diet if you have a baby or a young child.

### Which foods are good sources of iron?

A varied and balanced diet should provide an adequate iron intake. The following foods are particularly good sources of iron:

- Lean red meat
- Turkey and chicken
- It is well known that liver is rich in iron, but liver is NOT recommended for pregnant women because of its high Vitamin A content
- Fish, particularly oily fish which can be frozen or canned (such as mackerel, sardines and pilchards)





**Appendix 7****Example IV iron protocol – iron sucrose (Venofer®)****PROTOCOL****Administration of intravenous iron sucrose (Venofer®) for the correction and management of pre-operative and post-operative iron deficiency anaemia****Background**

Iron deficiency anaemia can compound and delay recovery from any surgical procedure, and patients may unnecessarily receive a blood transfusion to correct their anaemia pre or post-operatively.

In the pre-operative period it is essential to ensure that the patient has an adequate haemoglobin to enable them to tolerate a post operative fall in haemoglobin. The majority of patients may be able to tolerate this drop. However, if the potential loss is likely to be significant or the patient has co-morbid disease, then pre-surgical prevention may be required.

In normal health only 1-2mg of iron is absorbed from the diet and equates to daily iron loss. Iron deficient patients may increase the amount of iron absorbed through supplementation with oral iron therapy. However, there may be cases where iron demand may still exceed absorption, or where oral iron therapy causes significant gastro-intestinal side effects.

It is essential that when a patient has been diagnosed as iron deficient, that all other causes of anaemia are excluded e.g. B12, folate deficiency etc.

**Pre-surgical assessment**

Normal reference ranges:

Haemoglobin	Male:	13-18g/dl
	Female:	12-16g/dl
Iron status	Ferritin	30-350µg/l
	Transferrin saturation	>20%
	% red cell hypochromia	<2.5%

In the pre-operative period, when time to surgery is short, administering intravenous iron sucrose (Venofer®) would offer a rapid and targeted approach to promoting haemoglobin improvement and supporting iron stores in the post-operative period.

**Protocol pre-surgery**

Range	Reason	Dosage required
Hb normal	Boost iron stores	Venofer® 200mg x 2 (min 3 days pre-surgery)
Ferritin < 75 µg/l		
Hb < normal	Boost Hb level and iron stores	Venofer® 200mg x 5 (min 3 days pre-surgery)
Ferritin < 50 µg/l		
Hb <10g/dl	Boost Hb level and iron stores	Venofer® 200mg per 1g Hb required + 500mg to replace storage Fe
Ferritin < 30 µg/l		

**Post-surgery**

Hb < 10g/dl	Boost Hb level and iron stores	Venofer® 200mg per 1g Hb required + 500mg to replace storage Fe
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**Venofer® may be administered either as an infusion or as a bolus injection**

Venofer® 100mg in 100mls Normal Saline 0.9% over 30 minutes, or

Venofer® 200mg in 100mls Normal Saline 0.9% over 1 hour

Venofer® 100mg over 5 minutes (given via a butterfly)

Venofer® 200mg over 10 minutes

Venofer® is licensed for intravenous administration on alternative days e.g. Monday, Wednesday, Friday.

Adapted from Protocol for use of Venofer® in elective surgery.

[www.transfusionguidelines.org.uk/docs/pdfs/bbt\\_app-use\\_venofer-protocol.pdf](http://www.transfusionguidelines.org.uk/docs/pdfs/bbt_app-use_venofer-protocol.pdf)

## **Appendix 8**

### **Example IV iron protocol – iron dextran (CosmoFer®)**

#### **Guidelines for the use of iron as an alternative to transfusion in iron deficiency**

##### **Purpose / clinical Relevance**

To reduce / avoid the need for transfusion for patients with iron deficiency and sub-acute blood loss

##### **Introduction**

Iron deficiency is common and often poorly diagnosed and treated. This policy deals with the diagnosis of iron deficiency and treatment with iron. It does NOT attempt to address the need for investigation and treatment of the underlying cause. Early recognition and treatment of the iron deficiency will reduce the burden of chronic anaemia and reduce the need for blood transfusion. Reasons to avoid blood transfusion in favour of iron therapy include potential for a reduction in risks of infection, alloimmunisation, reduced costs and conservation of blood stocks. Acute blood loss, shocked or unstable patients are not covered by the scope of this document.

##### **Diagnosis of iron deficiency**

Pointers to chronic iron deficiency are anaemia, microcytosis and a low serum ferritin. Revealed or acute blood loss is common but can be intermittent. It is important to consider historical blood counts and alternative diagnosis such as Thalassaemia trait and anaemia of chronic disorder. Microcytosis may be less common in the presence of renal failure. Other helpful tests include reticulocytes and faecal occult bloods.

If in doubt, the consultant haematologists will help with the assessment of laboratory values and advise of further tests to be carried out.

Severe symptomatic anaemia which is chronic and stable may still be treated with iron rather than transfusion.

##### **Options for iron therapy**

###### **Oral iron**

This is appropriate first line treatment for the majority of patients unless already known to be intolerant of oral iron. Usually Ferrous Sulphate 200mg p.o. x 3 daily should be started. Gastrointestinal distress may be alleviated by reducing the frequency of dosing (although this will require a longer period of therapy). Other oral non-slow release preparations may be tried. The response to iron must be documented and usually 3 months therapy should be continued once all indices have normalised in order to replace the physiological stores.

###### **Parenteral Iron**

This must only be used where the diagnosis of iron deficiency is proven or after approval by consultant haematologist. Oral iron should have been considered first.

###### **Intramuscular Iron**

IM iron treatment (with CosmoFer®) is available but is unlikely to be more convenient than IV therapy.

###### **Intravenous Iron**

CosmoFer® has a license for a total dose infusion regime that is effective and convenient; one or two infusions may be required. Indications for IV iron may include the following: intolerance to oral iron, severe anaemia despite oral iron, ongoing blood loss, and malabsorption.

Dose is calculated according to body-weight and iron deficit, consult product literature.

##### **Investigation of the cause**

The diagnosis of iron deficiency should normally lead to an evaluation of the likely cause and appropriate treatment for this. However, this is beyond the scope of this document.

Adapted from Guidelines for use of CosmoFer® – Roral West Sussex NHS Trust –  
St Richards Hospital Pathology Department

[www.transfusionguidelines.org/docs/pdfs/bbt\\_app-use\\_guide-for-use-of-iron.pdf](http://www.transfusionguidelines.org/docs/pdfs/bbt_app-use_guide-for-use-of-iron.pdf)

## Appendix 9

### Example patient information sheet – Intravenous Iron Therapy (CosmoFer®)

#### PATIENT INFORMATION SHEET

#### INTRAVENOUS IRON THERAPY

##### What is anaemia

Oxygen is carried around the body by red cells within the blood. The oxygen-carrying part of red cells is haemoglobin; this is an iron rich substance that gives red cells its red colour. Anaemia occurs when the haemoglobin falls. It has many causes and is due either to a lack of red blood cells, or to each cell containing too little haemoglobin or iron.

##### Symptoms of Anaemia

The first symptoms may include tiredness and palpitations (awareness of own heartbeat). Shortness of breath and dizziness are common.

##### Iron Deficiency

Without sufficient iron, the body cannot make normal red cells in adequate numbers. The daily need for iron in good health is provided by a healthy diet. The body normally has some iron stored in case of need in the future.

##### Causes of Iron Deficiency

There are a variety of causes. Some examples are:

- Lack of iron in the diet;
- Poor iron absorption;
- Blood loss, for example, bleeding from the bowel (blood loss from the bowel is never normal).

The cause of iron deficiency needs to be considered and may require a variety of investigations. Diagnosis and treatment of the cause of iron deficiency may have been organised by your GP or referring consultant.

##### Treatment of Iron Deficiency

###### Blood Transfusion

Blood transfusions should only be used rarely to treat iron deficiency. Although they are generally considered safe, there are some risks involved.

Iron therapy is a more efficient means of giving iron than a blood transfusion.

Iron therapy preparations are not derived from blood.

###### Oral Iron

Iron therapy by mouth is the safest, effective and preferred treatment for most people with iron deficiency. However, some people do not tolerate oral iron therapy, and complain of a variety of side effects. Often these side effects are dose-related, and reducing the dose can reduce the symptoms. Unfortunately, for some people, iron therapy by mouth alone is not possible. Before we offer intravenous iron therapy, we will ensure that your iron deficiency is appropriate for this form of treatment, and that there is good reason why treatment with oral iron is not possible or adequate.

##### Intravenous Iron Therapy

Iron deficiency can be treated using a 'drip' into a vein in your arm. This takes approximately six hours.

##### Is intravenous Iron Therapy Safe?

The main risk of an iron infusion is the potential for an allergic reaction. To guard against this we usually start with a small 'test dose' of the drug over one hour. If there are no problems, we will then progress to the full dose, which is usually given over five hours. If you feel unwell at any stage please tell us. Most infusions pass entirely uneventful.

##### After Iron Infusion

Please avoid oral iron for five days afterwards. If you have severe anaemia you may need a repeat infusion in about one month's time. It is usual to have some further blood tests to confirm you have responded adequately to the iron therapy and a review of initial investigations. A full response to the treatment may take six weeks, though usually you will feel better well before that.

**If you have any questions or worries, please ask your nurse or doctor**