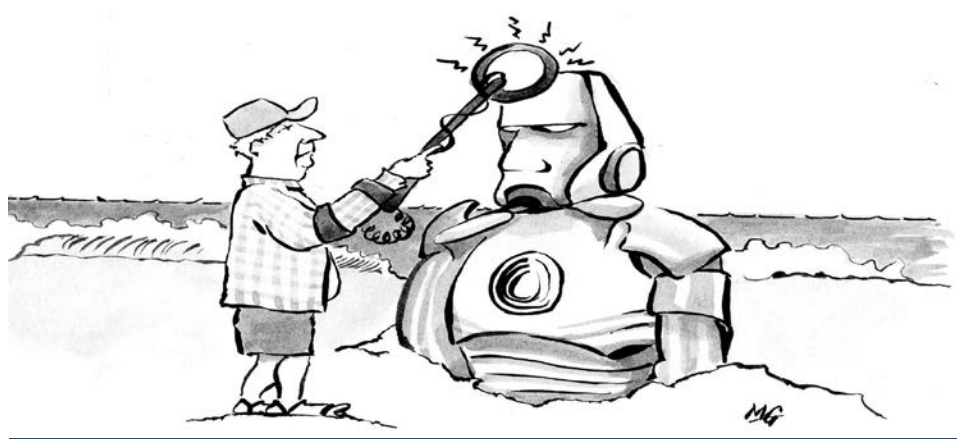


Update on the management of iron deficiency

Outline

- Need to improve management & avoid transfusion
 - Diagnosis & investigation
 - Oral iron & IV iron
 - Tools & resources
- No conflicts of interest





“All natural” iron supplement that’s gentle on the stomach...



- BONUS tissue transplant in each bag!
- Prescribed simply with the aid of a pen

2001 NHMRC Blood Component Guidelines



CLINICAL PRACTICE GUIDELINES

Appropriate Use of Blood Components

- Use of blood components for clinical or laboratory indications not listed here is likely to be inappropriate. Consult the NHMRC/ASBT guidelines (www.nhmrc.gov.au) for further details.
- Clinical and laboratory indications for use should be documented.

Red blood cells

Hb*	Considerations
< 70g/L	Lower thresholds may be acceptable in patients without symptoms and/or where specific therapy is available.
70-100g/L	Likely to be appropriate during surgery associated with major blood loss or if there are signs or symptoms of impaired oxygen transport.
> 80g/L	May be appropriate to control a patient on a chronic transfusion suppressive therapy.
> 100g/L	Not likely to be appropriate unless

- * Hb should not be the sole deciding factor. Consider symptoms of hypoxia, ongoing blood loss and the

Platelets

Use of platelets is likely to be appropriate:

Indication	Considerations
Bone marrow failure	At a platelet count of $<10 \times 10^9/L$ and $<20 \times 10^9/L$ in the presence of antibiotics, evidence of systemic
Surgery/ invasive procedure	To maintain platelet count at >50 with high risk of bleeding (see also appropriate to maintain at $100 \times 10^9/L$)
Platelet function disorders	May be appropriate in inherited or depending on clinical features a platelet count is not a reliable in

Platelets

Use of platelets is likely to be appropriate as therapy:

Indication	Considerations
Bleeding	May be appropriate in any patient in whom thrombocytopenia is considered a major contributory factor.
Massive haemorrhage/ transfusion	Use should be confined to patients with thrombocytopenia and/or functional abnormalities who have significant bleeding from this cause. May be appropriate when the platelet count is $<50 \times 10^9/L$ ($<100 \times 10^9/L$ in the presence of diffuse microvascular bleeding).

Fresh frozen plasma

Use of fresh frozen plasma is likely to be appropriate:

Indication	Considerations
Single factor deficiencies	Use specific factors if available.
Warfarin effect	In the presence of life-threatening bleeding. Use in addition to vitamin-K-dependent concentrates. Indicated where there is bleeding and abnormal coagulation. Not indicated for chronic DIC.
Acute DIC	Accepted treatment.
TTP	May be appropriate in patients undergoing high-risk procedures. Use specific factors if available.
Coagulation inhibitor deficiencies	May be appropriate in the presence of bleeding and abnormal coagulation.
Following massive transfusion or cardiac bypass	May be appropriate in the presence of bleeding and abnormal coagulation.
Liver disease	May be appropriate in the presence of bleeding and abnormal coagulation.

Cryoprecipitate

Use of cryoprecipitate is likely to be appropriate:

Indication	Considerations
Fibrinogen deficiency	May be appropriate where there is clinical bleeding, an invasive procedure, trauma or DIC.

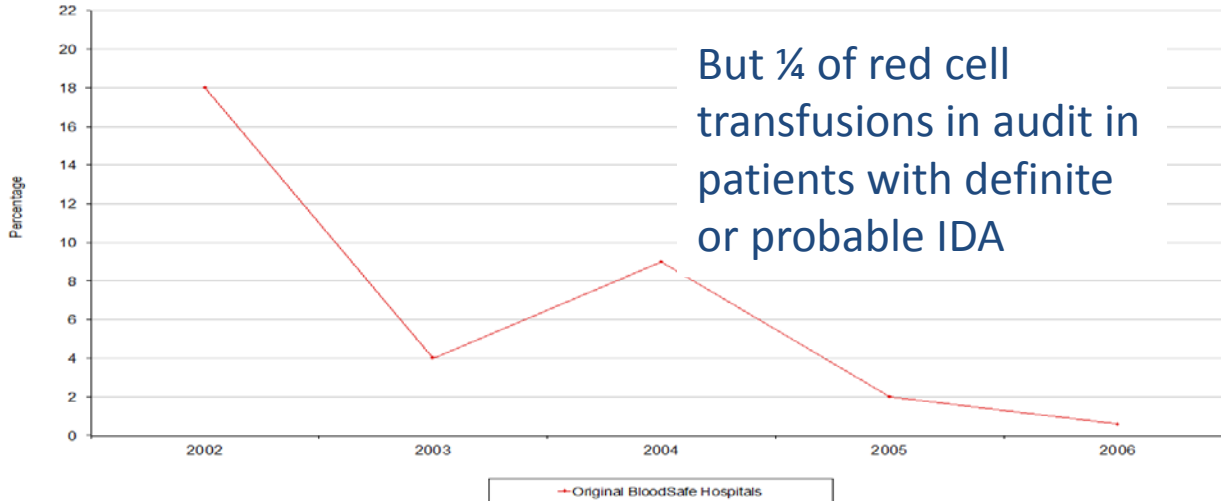
Abbreviations: Hb = haemoglobin; DIC = disseminated intravascular coagulation; TTP = thrombotic thrombocytopenic purpura.

ISBN 186-49606-90 October 2001



Transfusion outside NHMRC Guidelines

Red Cells Outside NHMRC Guidelines



“This red line indicates the change in this red line over a period of time.”



Red cell Transfusion in IDA

- when an immediate increase in oxygen delivery is required, such as when the patient is experiencing end-organ compromise, or
- where IDA is complicated by serious, acute ongoing bleeding

Doesn't replenish deficient iron stores!

“Please regard my own blood as a valuable & unique natural resource that should be conserved & managed appropriately”

BAD NEWS. YOUR BLOOD GROUP HAS
BEEN DISCONTINUED.



3 Pillars of Patient Blood Management (PBM)

☑ Optimise Hb



☑ Minimise blood loss



☑ Tolerance of anaemia





Module 1 Critical Bleeding/Massive Transfusion is intended to assist and guide health-care professionals in making clinical decisions when managing patients with critical bleeding who require or are likely to require massive transfusion.

Module 1 is currently being reviewed. The review is being conducted as part of a pilot project to test various approaches to update the PBM Guidelines. The aim of the pilot is to use the lessons learned from the review of Module 1 to update the remaining modules using more efficient and cost-effective methodologies.



Module 2 Perioperative is intended to inform health-care practitioners, health educators, health service managers and policy makers about the pre, intra and postoperative care of patients undergoing surgery or invasive procedures, particularly those in which blood loss is anticipated.



Module 3 Medical is intended to assist and guide clinical decisions and coordination of health-care across the primary, secondary and tertiary care setting for patients with acute or chronic medical conditions requiring haematological intervention.



Module 4 Critical Care is intended to assist and guide health-care professionals in making clinical decisions when managing patients requiring critical care.



Module 5 Obstetrics and Maternity is intended to assist and guide health-care professionals in making clinical decisions when managing pregnant and postpartum women.



Module 6 Neonatal and Paediatrics is intended to assist and guide health-care professionals in making clinical decisions about blood management in neonatal and paediatric patients.

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"What's that boy?! A paradigm shift?!"

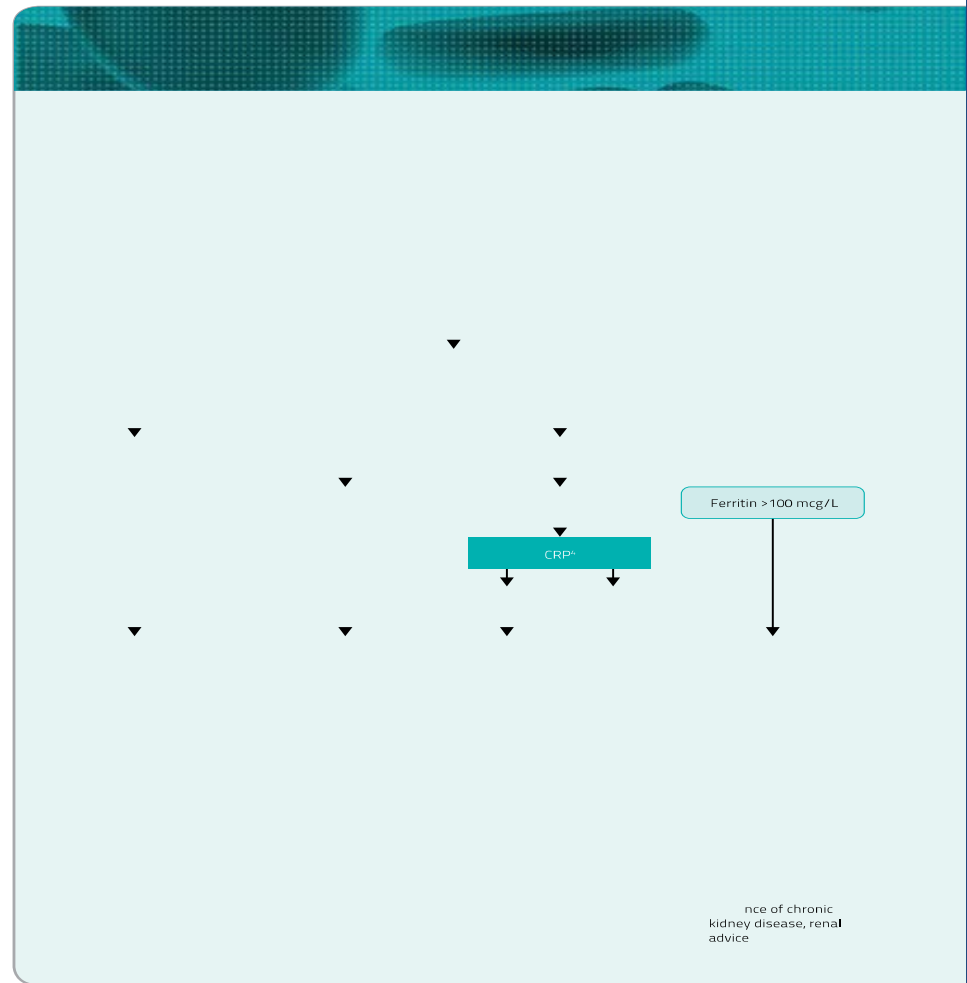
Patient Blood Management Guidelines

<http://www.blood.gov.au/pbm-guidelines>

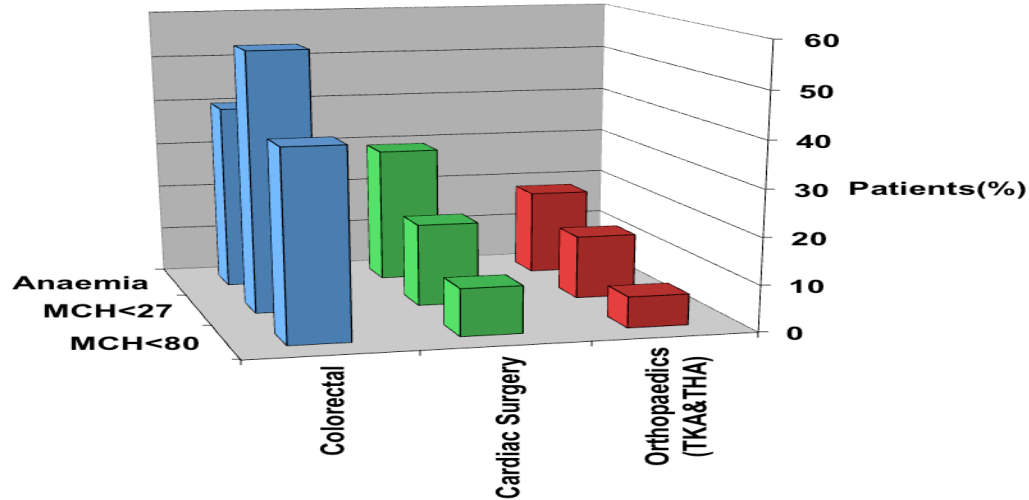
Patient Blood Management
Guidelines: Module 2

Perioperative

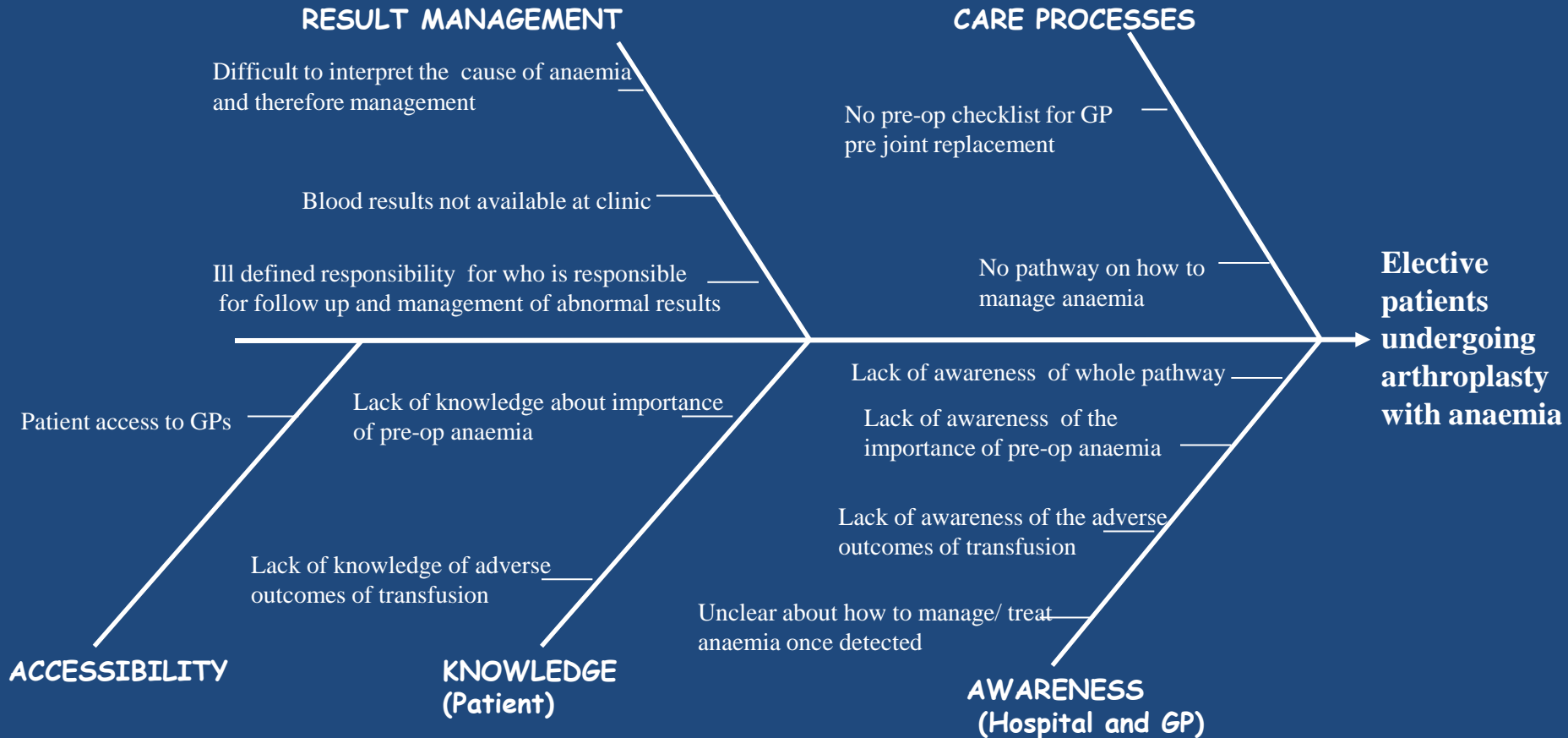
Quick Reference Guide



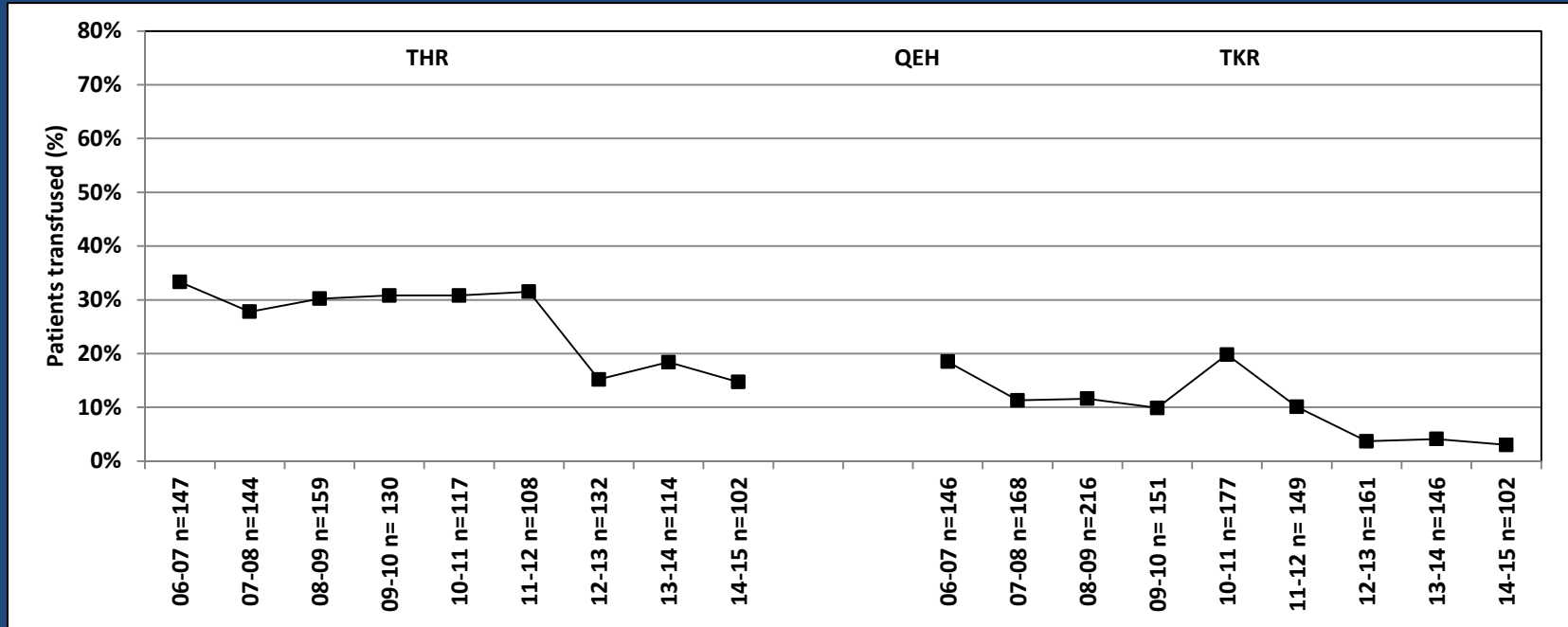
% Patients anaemic & with low red cell indices before elective surgery in SA 2008-10



Barrier Analysis: Cause & Effect Diagram



Transfusion rates 1^o arthroplasty

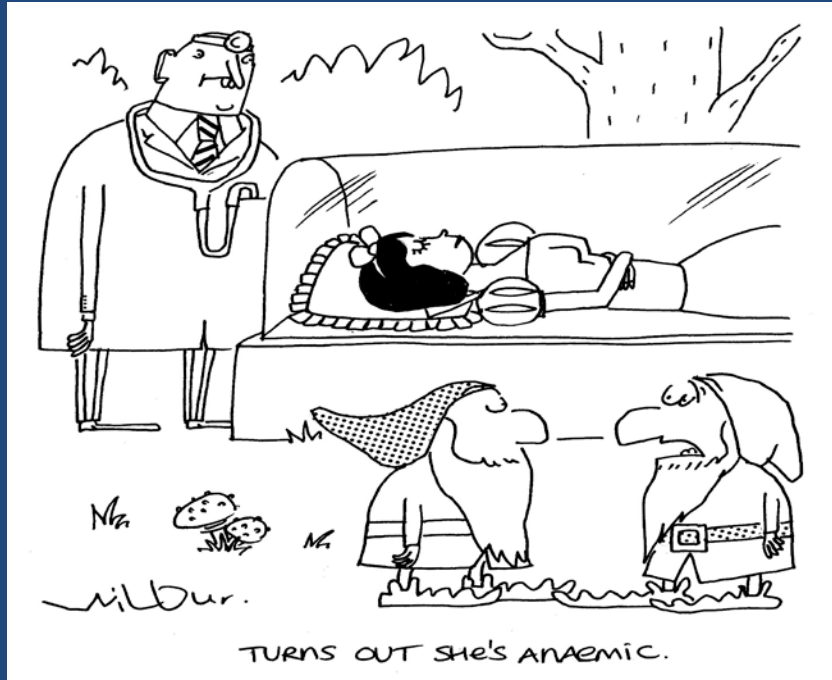


IDA in hospitalised patients

- Retrospective case note review of patients with code of IDA (45% included)
- 119 patients in 2.5 years in 1 hospital in Vic
 - of 66 transfused:
 - 36% no iron, 26% IV iron, 38% oral
 - of 53 not transfused:
 - 23% no iron, 14% IV iron, 60% oral
 - 55% managed according to proposed guidelines (9% in cardiac patients)



Anaemia in persons ≥ 65 years in US

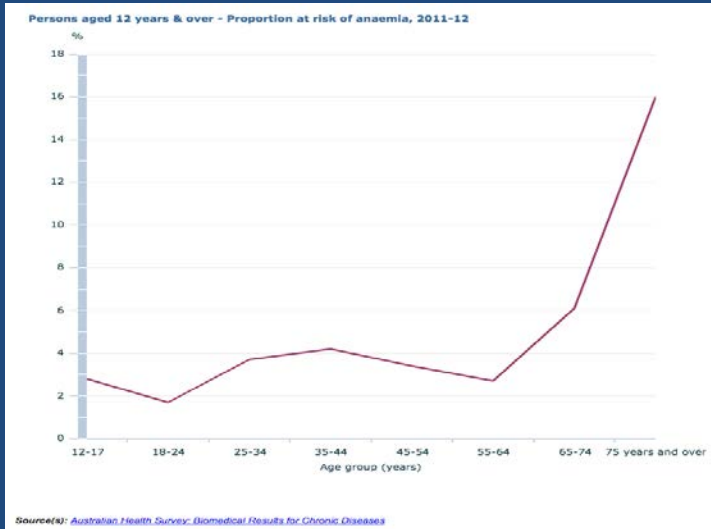


NHANES III 1988 – 1994

- 10% of people in US > 65 y
- 20% of people in US > 85 y
 - 1/3 due to nutrient deficiency (20% IDA)
 - 1/3 due to CKD and/or ACD (12% CKD)
 - 1/3 unknown cause

Guralnik et al Blood 2004

Anaemia by age in Australia: NHMS 2011-12



2011-12 National Health Measures Survey (NHMS)
N = 11,000, part of 2011-13 Australian Health Survey
N = 30,000 (80% participation rate)

Anaemia

6.4% women v 2.5% men

12.6% diabetics v 4.7% non-diabetics

16.1% with abnormal eGFR v 3.1% without

Low ferritin in women

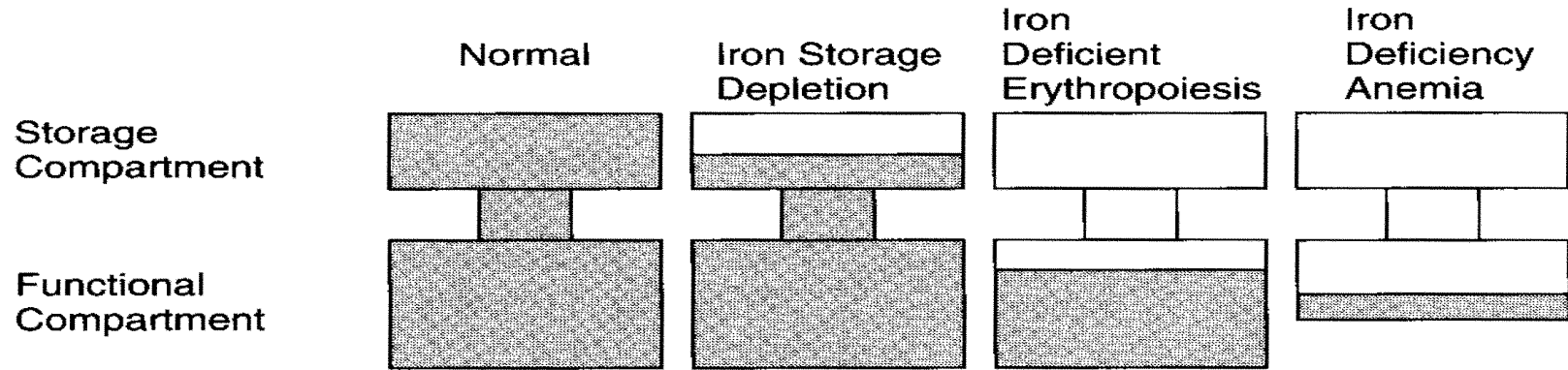
(low + normal Hb)

≤ 15 mcg/L = 8%

≤ 20 mcg/L = 12%

≤ 30 mcg/L = 22%

Changes with increasing iron deficiency

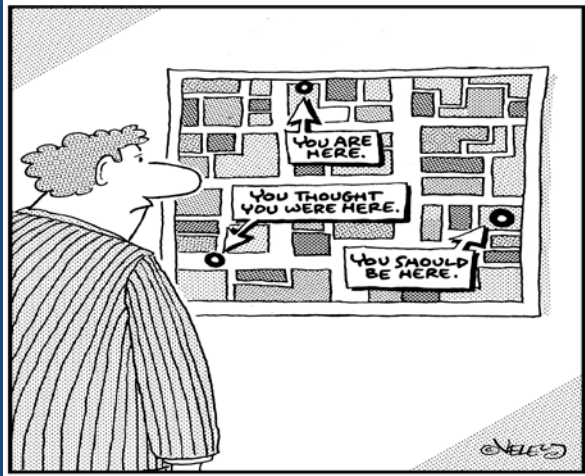


© Randy Glasbergen
glasbergen.com



'I need something to make me feel better.
Can you prescribe a Porsche?'

2009 National IDA Meeting Priorities



- Knowledge gap in interpretation of pathology results
 - red cell indices
 - iron studies
 - influence of inflammation
- Clinician knowledge of Australian oral & IV products
- Hospital / Primary care access to oral & IV preparations

Clinical update

Diagnosis and management of iron deficiency anaemia: a clinical update

Sant-Rayn S Pasricha, Stephen C Flecknoe-Brown, Katrina J Allen, Peter R Gibson, Lawrence P McMahon, John K Olynyk, Simon D Roger, Helen F Savoia, Ramdas Tampi, Amanda R Thomson, Erica M Wood and Kathryn L Robinson*

Med J Aust 2010; 193 (9): 525-532.

Article Authors Refe

Abstract

- Iron deficiency anaemia is a common and worldwide, especially in women, and IDA may be effectively diagnosed by examination and serum ferritin. Ferritin should not be used to diagnose IDA.



Iron Deficiency

CLINICAL UPDATE



UPDATED OCTOBER 2015
FIRST EDITION 2008
Gastroenterological Society of Australia

CLINICAL UPDATE

Diagnosis and management of iron deficiency anaemia: a clinical update

Sant-Rayn S Pasricha, Stephen C Flecknoe-Brown, Katrina J Allen, Peter R Gibson, Lawrence P McMahon, John K Olynyk, Simon D Roger, Helen F Savoia, Ramdas Tampi, Amanda R Thomson, Erica M Wood and Kathryn L Robinson*

The diagnosis and management of iron deficiency anaemia (IDA) remains a challenge. It is an important public health problem in Australia, with the World Health Organization (WHO) estimating that 8% of preschool children, 12% of pregnant women and 15% of non-pregnant women of reproductive age in Australia have anaemia, with IDA a major cause.

ABSTRACT

Iron metabolism: a brief overview
Most body iron (ie, 2.6g of 3–4g) circulates as haemoglobin (Hb), which is recycled when red cells senesce. One gram is stored in the liver, and 0.4 g in myoglobin and cytochromes. Small amounts (3 mg) circulate bound to plasma transferrin. Men and non-menstruating women lose about 1 mg of body iron per day; menstruating women may lose an additional 1 mg daily on average. Full-term babies are born with 180 mg iron, but must double their red cell mass within 12 months (low birth weight infants need to more than double their red cell mass). Requirements escalate rapidly during adolescence with increasing blood volume and lean body mass, compounded in females by the onset of menstruation, and in pregnancy by increases in maternal red cell mass and fetal erythropoiesis.

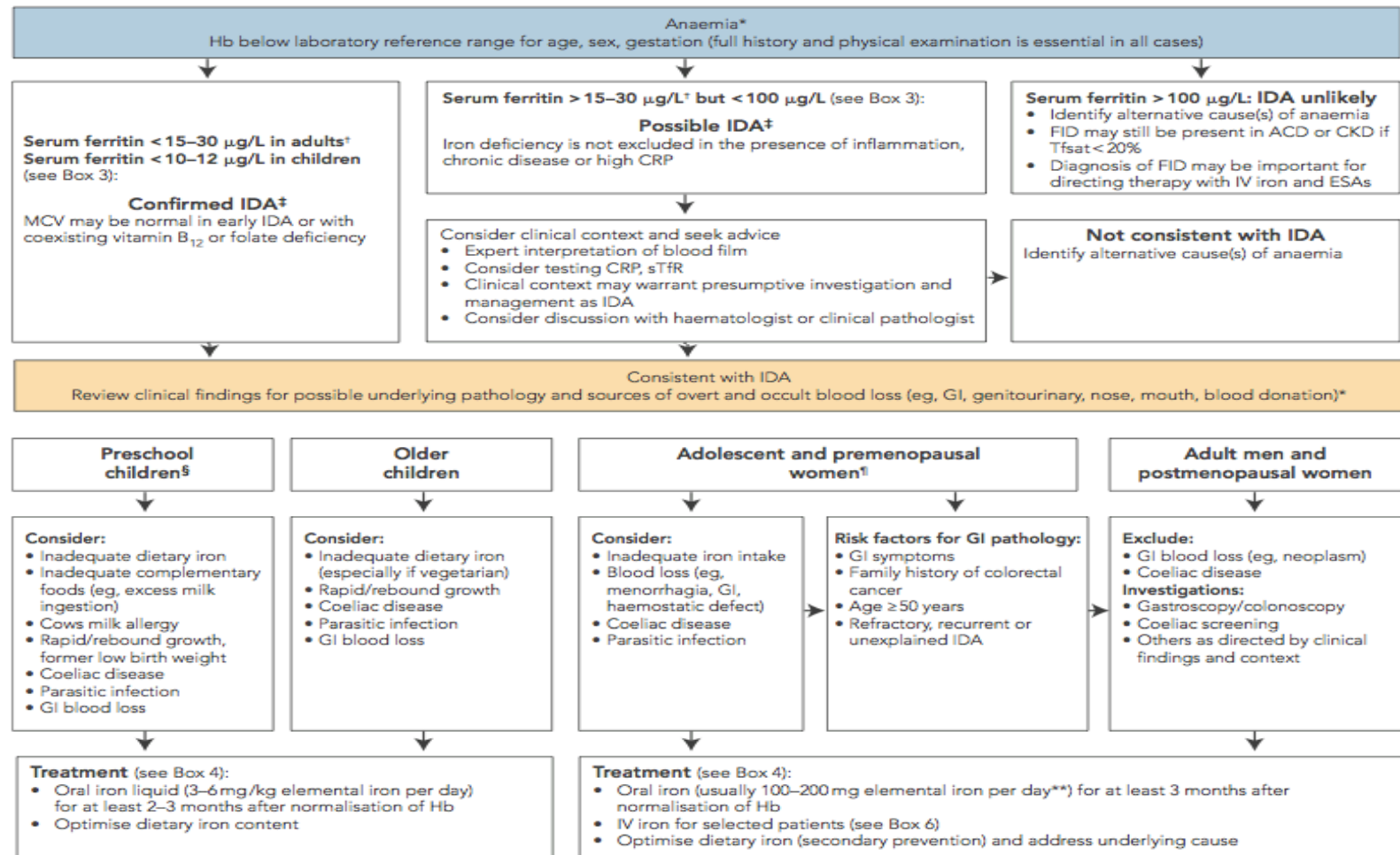
Dietary iron comprises haem (animal sources) and non-haem iron (cereal and vegetable sources). Haem iron (bound to Hb and myoglobin) is better absorbed than non-haem iron. Non-haem iron is absorbed by intestinal luminal cells through a specific transporter (divalent metal transporter, located on the apical membrane of intestinal enterocytes), and released into the circulation where it binds to transferrin. Transferrin receptors on erythroblasts accept iron-transferrin complexes; these undergo endocytosis and the iron is incorporated into Hb. Although the specific mechanism of haem-iron absorption remains unclear, putative transporters have been identified.¹

Iron absorption is upregulated by iron deficiency and increased erythropoiesis, and downregulated in inflammation and iron repletion, mediated by the recently described regulator of iron homeostasis, hepcidin, which blocks iron release from enterocytes and macrophages.² Body iron stores are regulated through iron absorption. Non-haem iron is best absorbed in the ferrous form (Fe²⁺). Reduction of ferric iron (Fe³⁺) by stomach acid, dietary ascorbic acid and luminal reductases optimises absorption. Non-haem iron absorption is inhibited by simultaneous consumption of phytates (in cereals and legumes), tannins (in tea) and calcium. Simultaneous consumption of haem-iron sources and ascorbic acid enhances absorption. Less than 20% of available iron is absorbed in a typical Western diet, lower still from a vegetarian diet. Recommended daily intakes of iron at different stages of life are listed in Box 1.

Causes and implications of iron deficiency
Iron deficiency results when iron losses or requirements exceed absorption, and is often multifactorial. It is common in children

*In priority, A writing group was formed to provide a clinical update specific for the Australian setting.

2 Iron deficiency anaemia (IDA): assessment and management*



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eLearning Australia
Award winning transfusion practice and patient blood management education

Kathryn Robinson

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Iron Deficiency Anaemia (IDA)

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BloodSafe
eLearning Australia
www.bloodsafelearning.org.au



Our Iron Deficiency Anaemia (IDA) Course

Aims to increase knowledge to diagnose, investigate and manage IDA.

Based on the Pasricha, S et al, 2010, Diagnosis and management of iron deficiency anaemia: a clinical update, Med J Aust, 193 (9):525-532.

For a multi-disciplinary audience e.g. medical clinicians, nurses, midwives, pharmacists and dieticians.

Interactive tools e.g. an algorithm to assist with diagnosis and treatment.

Downloadable commercial oral iron preparation chart for clinicians and patient information: 'Boosting your blood with iron' and 'Intravenous iron infusions'.

Includes clinical case studies and online assessment.

Certificate for Continuing Professional Development (CPD).

-  CONVENIENT
-  BEST PRACTICE
-  CPD POINTS
-  SIGN UP FREE

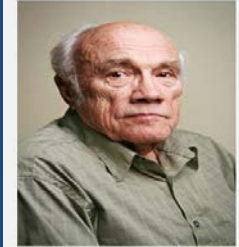
Our App



An IDA Algorithm
Designed to increase your understanding of the diagnosis, investigation and management of Iron Deficiency Anaemia.




updated 9/15



Mr Komar is an 82 year old man with ischaemic heart disease (IHD) who was admitted for coronary angioplasty (PTCA) and insertion of a stent.

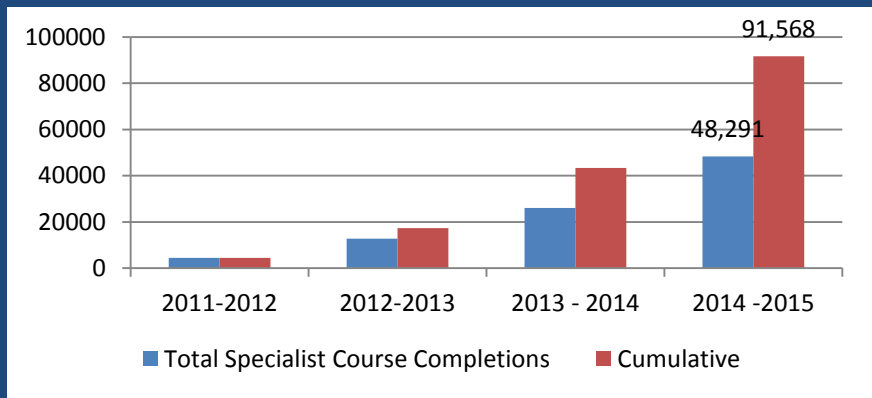
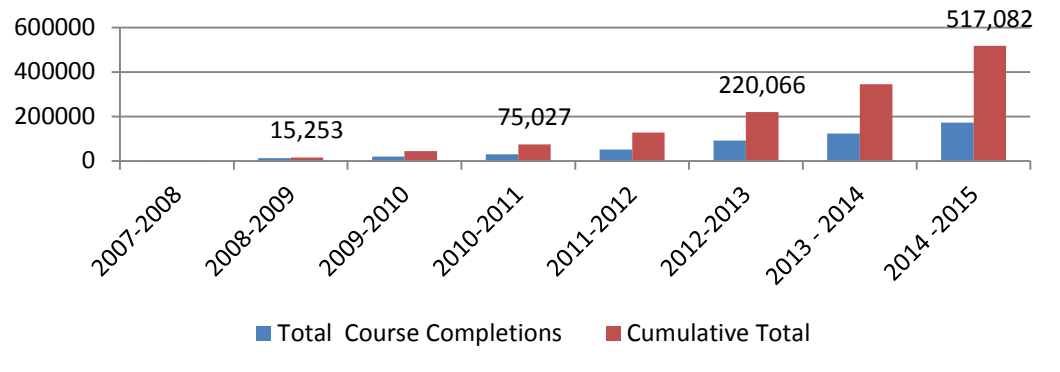
He was noted to have a Hb level of 96 g/L pre-procedure when the medical resident was completing the discharge summary 3 weeks later.

The day after the procedure the Hb was 89 g/L. The medical resident contacted the patient to check on his clinical status and arrange for a repeat FBE and iron studies.

The patient was on dual antiplatelet agents and had not had any overt blood loss. He had a history of IHD and cardiac failure and his eGFR was reduced at 40 mL/min.

FBE results and iron studies

ring Australia



1 Use the tabs below to explore the stages of iron deficiency¹

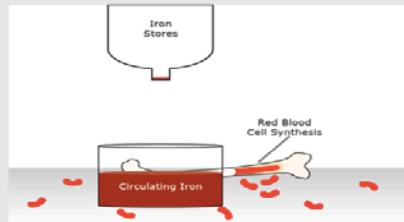
Iron stores
are adequate

Iron stores
falling

Iron stores
depleted

Iron deficient
red cell production

Iron deficiency
anaemia



Iron stores depleted

With continued negative iron balance, iron stores are depleted and will no longer be able to supply iron to the plasma.

Iron is transported in the plasma bound to transferrin. This iron is used for haemoglobin synthesis. Body iron stores, including those in the bone marrow, are now exhausted.

The serum ferritin level falls further (reflecting storage iron depletion) and the transferrin saturation, which reflects transport iron, becomes low. Haemoglobin and red cell production (erythropoiesis) however remain normal.

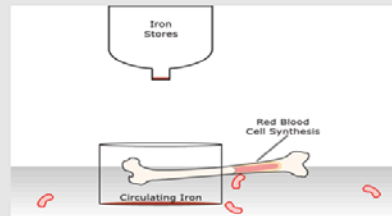
Iron stores
are adequate

Iron stores
falling

Iron stores
depleted

Iron deficient
red cell production

Iron deficiency
anaemia



Iron deficiency anaemia

Red cell production is reduced. Haemoglobin is below the laboratory reference range (for age/sex/gestation). The fall in haemoglobin level is followed by a fall in MCH and then a fall in MCV.

If previous results are available, a fall within the normal range may be evident before they become abnormal.

Changes on blood film examination are not usually marked until the haemoglobin level falls below 100–110 g/L, when characteristic features, including abnormally shaped red cells appear (e.g. elongated red cells called 'elliptocytes' and very narrow cells called 'pencil cells').

IDA App



The Iron Deficiency Anaemia (IDA) Algorithm is now available for **iOS (iPhone, iPad and iPod)** and **Android**.

The iron deficiency anaemia algorithm is an educational tool designed to increase your understanding of the diagnosis, investigation and management of iron deficiency anaemia.

Access for **free** from your mobile device.



IDA investigation and management algorithm tool

Is anaemia present? ⁴

Is haemoglobin below laboratory reference range for age, sex and gestation?

Yes

No

Full history and examination is essential in all cases.



IDA investigation and management algorithm tool

What is the ferritin level?

- Serum ferritin <15-30 mcg/L in adults ♦ or <10-12 mcg/L in children ♦
- Serum ferritin >15-30 mcg/L but <100 mcg/L
- Serum ferritin >100 mcg/L

Ferritin is an acute-phase protein and is elevated in inflammation, infection, liver disease and malignancy. This can result in misleadingly elevated ferritin levels in iron-deficient patients with coexisting systemic illness. In the elderly or among patients with inflammation, iron deficiency may still be present with ferritin values up to 60–100 mcg/L. Serum iron should not be used to diagnose iron deficiency as it is low in both iron deficiency and inflammation and has a marked diurnal variation.



IDA investigation and management algorithm tool

Confirmed IDA [†]

In an anaemic adult, a ferritin level <15 mcg/L is diagnostic of iron deficiency, and levels of 15-30 mcg/L are highly suggestive. In children, lower thresholds (ferritin $<10-12$ mcg/L) or levels below the age specific cut-offs for the laboratory performing the tests are used. MCV may be normal in early IDA or with co-existing B12 or folate deficiency.

Investigate underlying causes

Use the button to investigate underlying cause/s of IDA



IDA investigation and management algorithm tool

Consistent with IDA

Investigate and determine the underlying cause(s) of IDA. Review clinical findings for possible underlying pathology and sources of overt & occult blood loss (eg GI, genitourinary, nose, mouth, blood donation) ♦

Choose an appropriate category for information on possible underlying causes:

- Pre-school children ♦
- Older children
- Adolescent & premenopausal women ♦
- Adult men & postmenopausal women

The management of IDA involves two CONCURRENT components: determination and treatment of the underlying cause(s) (such as bleeding) and iron therapy to normalise the haemoglobin and replenish iron stores.



IDA investigation and management algorithm tool

Adult men and postmenopausal women

Investigations to exclude GI pathology

Exclude:

- GI blood loss (eg neoplasm)
- Coeliac disease

Investigations:

- Gastroscopy/colonoscopy
- Assessment for coeliac disease
- Others as directed by clinical findings and context

Treatment options

The management of IDA involves two CONCURRENT components: determination and treatment of the underlying cause(s) (such as bleeding) and iron therapy to normalise the haemoglobin and replenish iron stores.

Use the button to explore possible treatment options



Look for a cause of iron deficiency in parallel to treatment

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GASTROENTEROLOGY

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Home > Sections > Small Bowel & Nutrition > Guidelines > Guidelines for the Management of Iron Deficiency Anaemia

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SECTIONS

Sections Menu

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- Adolescent & Young Persons
- Association of GI Physiologists
- BSG Endoscopy
- BSGNA
- Colorectal
- Gastrointestinal
- Inflammatory Bowel Disease
- Liver
- Neurogastroenterology

Guidelines for the Management of Iron Deficiency Anaemia

Andrew F Goddard, Martin W James, Alistair S McIntyre, Brian B Scott, on behalf of the British Society of Gastroenterology

Cut 2011;69:1309-1316. doi:10.1136/gut.2010.228874

Introduction

Iron Deficiency Anaemia (IDA) occurs in 2-5% of adult men and postmenopausal women in the developed world and is a common cause of referral to gastroenterologists (4-13% of referrals). While menstrual blood loss is the most common cause of IDA in premenopausal women, blood loss from the GI tract is the most common cause in adult men and postmenopausal women. Asymptomatic colonic and gastric carcinoma may present with IDA, and seeking these conditions is a priority in patients with IDA. Malabsorption (most commonly from coeliac disease in the UK), poor dietary intake, blood donation, gastrectomy and use of non-steroidal anti-inflammatory drugs (NSAIDs) are common causes of IDA, and there are many other possible causes. IDA is often multifactorial. Its management is often suboptimal, with most patients being incompletely investigated or not investigated at all. Dual pathology - that is, the presence of a significant cause of bleeding in both upper and lower GI tracts - may occur in 1-10% of patients or more and should be increasingly considered the older the patient.

[Download Guideline \(180 kb\)](#)



IDA investigation and management algorithm tool

Adolescent and premenopausal women ⁴

Consider the following, then use the button to explore risk factors for gastrointestinal (GI) pathology

- Inadequate iron intake
- Blood loss (eg menorrhagia, GI, haemostatic defect)
- Coeliac disease
- Parasitic infection
- Risk factors for GI pathology

Risk factors

The management of IDA involves two CONCURRENT components: determination and treatment of the underlying cause(s) (such as bleeding) and iron therapy to normalise the haemoglobin and replenish iron stores.

Use the button to explore risk factors for GI pathology



IDA investigation and management algorithm tool

Risk factors for GI pathology

Consider the following GI risk factors then use the button for information on further investigations to exclude pathology

- GI symptoms
- Family history of colorectal cancer
- Age ≥ 50 years
- Refractory, recurrent or unexplained IDA

Further investigations

The management of IDA involves two CONCURRENT components: determination and treatment of the underlying cause(s) (such as bleeding) and iron therapy to normalise the haemoglobin and replenish iron stores.

Click the button to explore exclusions and investigations

IDA investigation and management algorithm tool

Treatment options in adults

Options:

- Oral iron: usually 100-200mg elemental iron per day ♦ for at least 3 months post normalisation of Hb
- IV iron for selected patients ♦
- Optimise dietary iron (secondary prevention) and address underlying cause

Refer to the list of commercially-available forms of iron supplementation in Australia suitable for the treatment of IDA in Module Three of the BloodSafe eLearning IDA course. See Module Four for indications for IV iron. Click on the home button below to start again.



Anaemia management :: SA Health - Windows Internet Explorer provided by SA Health

http://www.sahealth.sa.gov.au/vps/wcm/connect/public+content/sa+health+internet/clinica bloodsafe sa health

File Edit View Favorites Tools Help

Favorites Web Slice Gallery

Anaemia management :: SA Health Page

- Anaemia management**
- BloodSafe education, standards and guidelines
- Blood product and fridge registers
- BloodSafe contacts
- BloodSafe information for consumers
- Dignity in Care
- Drug and alcohol programs
- Viral Hepatitis Nursing Support
- Nationally Funded Centres Program

BloodSafe eLearning Australia Iron Deficiency Anaemia app - The Iron Deficiency Anaemia algorithm is an educational tool designed to increase understanding of the diagnosis, investigation and management of Iron Deficiency Anaemia (IDA). The IDA Algorithm is now available as an app for iPhone, iPad and Android users.

BloodSafe eLearning Iron Deficiency Anaemia (IDA) module - The IDA course aims to update and enhance your knowledge about the diagnosis, investigation and management of IDA. It is designed for medical practitioners, nurses, midwives, pharmacists and other allied healthcare professionals such as dieticians.

Diagnosis and management of iron deficiency anaemia - An Australian clinical update from the Medical Journal of Australia, 2010.

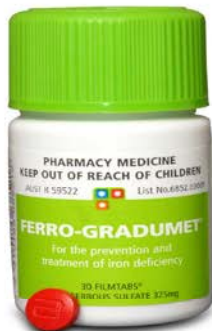
Guidelines for the Management of Iron Deficiency Anaemia - Comprehensive guidelines from the British Society of Gastroenterology with an excellent flow chart outlining the investigation of iron deficiency in different patient groups.

Oral iron dosing chart for clinicians (PDF 512KB) - Colour illustrations and dosing table of oral preparations available in Australia that are suitable for the treatment of iron deficiency anaemia.

Prescribing checklist for IV iron (PDF 99KB) - This checklist provides guidance on the indications, contradictions and precautions for the use of IV iron.

			g/5 mL	nil	\$16.00 250ml bottle PBS listed (\$19.35)[†]
--	--	--	---------------	-----	---

*Intended as a guide to the relative cost NOT price to the consumer (actual cost of OTC medicines may vary). Price guide from MIMS August 2011 except **Ferro-tab (RRP from AFT). [†]For PBS listed products, the PBS cost for concession holders is \$5.60 (at time of writing).
BloodSafe Oral Iron Table Version 1.7 October 2011, TP-L3-410. For updates & other resources see www.health.sa.gov.au/bloodsafe



BloodSafe Oral Iron Table Version 1.7 October 2011, TP-L3-410. Due to variations in computer colour profiles, when printed or viewed on screen, colours of these tablets may not be a true representation.

Maltofer (oral iron polymaltose) available in Australia since July 2015 – tablets (approx \$26 per 30), syrup



Boosting your blood with iron

Why iron tablets have been prescribed for you

This booklet is for people who have low levels of iron in their bodies and have been prescribed iron tablets. It explains why iron tablets are important and how they work.

Why is iron important?

Iron is used to prevent and build haemoglobin, a pigment that makes red blood cells red. When the amount of iron in the body gets too low, the haemoglobin level falls below normal. This is known as iron deficiency anaemia*. Haemoglobin is very red.

It has become very common over the years.

Why iron?

You're already getting iron from your diet, but it's not always enough to keep your iron levels up.

How the body is built from iron is a fact that can't be changed. The body needs iron to build red blood cells and to carry oxygen to all the organs.

For more information, talk to your GP, pharmacist, specialist, nurse or midwife.



Why is having a 'reserve' of iron important?

Any extra iron taken up by the gut that is not needed to make new red blood cells is stored by the body. This reserve of iron can then be used to make new blood cells as the body's 'reserve' iron is used by the body.

Taking iron tablets

Not all iron tablets contain enough iron to treat low iron levels.

This booklet is for people who have low iron levels in their bodies and have been prescribed iron tablets. It explains how to take them and how to reduce side effects.

Iron tablets with enough iron

A variety of iron tablets/brands are available without a prescription but most do not have enough iron in them to make a difference. Iron tablets with the right amount of iron include Ferroguard, Ferrograd G, Ferrofolin, Folid and FOF. Take the tablet recommended by your doctor. Do not use other iron tablets/brands instead.

How do I take iron tablets?

- Take as directed by your doctor (usually 1 tablet once or twice a day). If a tablet is needed twice a day then your doctor may recommend starting with 1 a day for a few days then increasing to twice a day.
- Iron is better absorbed if taken on an empty stomach (one hour before or two hours after a meal) if possible.
- Take iron tablets with water or juice (NOT tea or coffee).
- Iron tablets should be taken 2 hours or more after some types of medications including antibiotics (like tetracycline or cloxacillin), calcium tablets, A-some medications for osteoporosis, thyroid or Parkinson's as well as some antacids. Check with your doctor or pharmacist.

What side effects might I get?

Not everybody gets side effects from iron tablets. Occasionally they cause belly ache, nausea (feeling sick), constipation (stomach), constipation and diarrhoea.

These usually improve as your body gets used to them. If you have other symptoms or if the symptoms above become bad or worrying contact your doctor.

It is normal for iron tablets to make your stools/droppings (poop) turn black.

For more information

Talk to your GP, surgeon, specialist, nurse or midwife.

Iron tablet recommended:

Does:

Ways to ease side effects

- Taking iron tablets with food or at night may help some tummy upset.
- If constipation is a problem, increasing your daily fluid and fibre intake can help. Ask your doctor or pharmacist for advice regarding a gentle laxative if needed. This is always very successful help. (Discuss with your doctor).
- changing tablets (to a different iron salt) taking 1 tablet, 2 or 3 times per week taking a lower amount (50% or 75% of the strength of the tablet) on repeat.
- Some brands of iron tablets containing 42 or 35mg daily.

NOTE: There are many iron tablets/brands available with only very small amounts of iron in them (these they do not cause side effects). They are not strong enough to increase your iron levels quickly enough.

Other ways of giving iron

If iron tablets cannot be tolerated (especially when significant anaemia is present), intravenous (IV) iron through a drip may be needed. It is comparable with a specialist. This is not often required as the above suggestions are usually effective. Injection of iron into the muscle (IM) is not recommended as it is painful. It can cause permanent skin scars/implantation.

KEEP OUT OF REACH OF CHILDREN

- Iron tablets, like all medicines should be kept in a locked cupboard out of reach and sight of children.
- A small amount of iron can be poisonous, even fatal in infants and young children.
- Never give an adult dose to a child.
- If a child accidentally takes iron tablets call the Poisons Information Centre immediately on 131120.



Anemia resources & doctors including iron dosing charts: www.bloodsafe.org.uk

Vietnamese / Boosting your blood with iron

Tăng hàm lượng sắt trong máu

Tại sao bác sĩ cho bạn uống thuốc tăng cường chất sắt?

Tại sao này booklet cho những người có thể là thiếu chất sắt và đang chờ đợi, bác sĩ cho uống thuốc tăng cường chất sắt. Nó giải thích làm quen với những vấn đề này và sự cần thiết của chúng.

Tại sao sắt quan trọng cho cơ thể?

Sắt được dùng để ngăn ngừa và điều trị chứng thiếu máu. Sắt rất cần thiết, giúp cho cơ thể sản xuất haemoglobin mới, loại sắc tố làm hồng huyết cầu (hồng cầu). Khi lượng sắt trong cơ thể xuống quá thấp, haemoglobin xuống thấp quá mức thì người ta thiếu máu. Thiếu máu giúp ngăn cản quá trình máu vận chuyển oxy tới các bộ phận của cơ thể. Thiếu máu haemoglobin làm giảm lượng oxy cung cấp cho cơ thể để cho các bộ phận khác hoạt động. Thiếu máu haemoglobin làm giảm lượng oxy cung cấp cho cơ thể để cho các bộ phận khác hoạt động. Thiếu máu haemoglobin làm giảm lượng oxy cung cấp cho cơ thể để cho các bộ phận khác hoạt động.

Tại sao tôi cần phải uống thuốc tăng cường chất sắt?

Lượng haemoglobin thấp sẽ của bạn có thể là dấu hiệu của thiếu máu. Điều này có thể là do bạn đang bị mất máu hoặc do bạn đang bị thiếu máu. Có thể thiếu huyết đang rất nguy hiểm nếu không được điều trị kịp thời. Uống thuốc tăng cường chất sắt có thể giúp tăng lượng haemoglobin của bạn.

Thuốc tăng cường chất sắt là thuốc gì?

Có hai loại thuốc sắt. Một loại là thuốc sắt có tác dụng tăng cường chất sắt, loại kia là thuốc sắt có tác dụng tăng cường chất sắt. Thuốc sắt có tác dụng tăng cường chất sắt có tác dụng tăng cường chất sắt. Thuốc sắt có tác dụng tăng cường chất sắt có tác dụng tăng cường chất sắt. Thuốc sắt có tác dụng tăng cường chất sắt có tác dụng tăng cường chất sắt.

Muốn biết thêm chi tiết

Hãy gọi số hotline với những người khác, bác sĩ gia đình hoặc bác sĩ chuyên khoa về các vấn đề này.

Tại sao tôi không cần uống thuốc tăng cường chất sắt?

Các bác sĩ sẽ giúp bạn hiểu rõ hơn về những vấn đề này. Nếu bạn đang bị thiếu máu, bác sĩ sẽ giúp bạn hiểu rõ hơn về những vấn đề này. Nếu bạn đang bị thiếu máu, bác sĩ sẽ giúp bạn hiểu rõ hơn về những vấn đề này. Nếu bạn đang bị thiếu máu, bác sĩ sẽ giúp bạn hiểu rõ hơn về những vấn đề này.

Tôi cần phải uống thuốc tăng cường chất sắt trong bao lâu?

Thuốc tăng cường chất sắt thường cần phải uống ít nhất trong vài tháng, nhưng một khi mức độ thiếu máu đã được điều chỉnh thì bạn có thể ngừng uống thuốc tăng cường chất sắt. Tuy nhiên, bạn cần phải tiếp tục uống thuốc tăng cường chất sắt để ngăn ngừa thiếu máu tái phát. Bạn cần phải tiếp tục uống thuốc tăng cường chất sắt để ngăn ngừa thiếu máu tái phát. Bạn cần phải tiếp tục uống thuốc tăng cường chất sắt để ngăn ngừa thiếu máu tái phát.

Cách dùng thuốc của tôi giúp tăng cường chất sắt trong cơ thể là gì?

Một người khác đang uống thuốc tăng cường chất sắt để điều trị thiếu máu. Họ bắt đầu uống thuốc tăng cường chất sắt để điều trị thiếu máu. Họ bắt đầu uống thuốc tăng cường chất sắt để điều trị thiếu máu. Họ bắt đầu uống thuốc tăng cường chất sắt để điều trị thiếu máu.

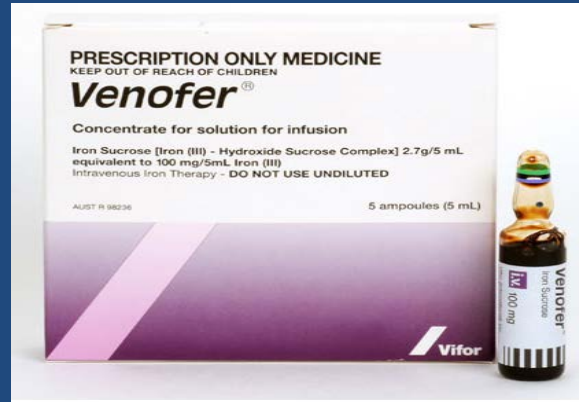


Anemia resources & doctors including iron dosing charts: www.health.gov.au/bloodsafe

Translations available

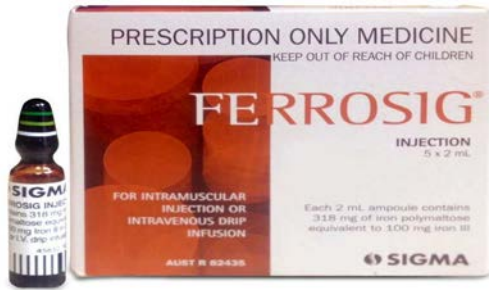
IV Iron in Australia

- Iron polymaltose (Ferrum H / Ferrosig)
- Iron sucrose (Venofer)
- Iron carboxymaltose (Ferinject)





				arboxymaltose
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IV Iron Prescribing Checklist

PATIENT LABEL

INDICATION

*Confirmed Iron Deficiency Anaemia AND:

**See Clinical Update on Iron Deficiency Anaemia MJA 2010*

UR No:
Name:
D.O.B: Sex:
Doctor: Ward:

- Short time to non-deferrable surgery associated with substantial blood loss
- Rapid iron repletion clinically important to prevent decompensation or transfusion
- Demonstrated intolerance to oral iron (despite modification of dose and frequency)
- Demonstrated non-compliance with oral iron
- Demonstrated lack of efficacy with therapeutic doses of oral iron (100-200 mg of elemental iron a day, eg. 1 or 2 tablets per day of either Ferro-tab, Ferro-F-tab, Ferrogradumet, Ferrograd C, Fefol or FGF)
- Ongoing iron (blood) losses exceeding absorption
- Malabsorption of iron
- Absolute or functional iron deficiency in chronic heart failure (as per national guidelines)
- Absolute or functional iron deficiency in chronic kidney disease (as per Renal Unit guidelines)

Details re indication

Contraindications

NONE

- Anaemia not due to iron deficiency (diagnosis must be based on laboratory tests, seek advice if cause of anaemia is unclear)
- Evidence of iron overload or disturbances of iron utilisation including haemochromatosis
- Known hypersensitivity to IV or IM iron (discuss choice of IV iron preparation and indication with an expert such as haematologist, nephrologist, gastroenterologist or other specialist)

Previous IM or IV iron

NONE

Precautions

- Significant liver dysfunction (discuss risks / benefits with gastroenterologist), avoid in patients with hepatic dysfunction where iron overload is a precipitating factor, in particular porphyria cutanea tarda
- Use with caution in acute or chronic infection after assessing risks / benefits & seek expert advice. Avoid during active systemic infection / bacteraemia
- Use with caution in asthma, eczema or atopic allergies, consider in hospital use – seek expert advice
- In pregnancy seek expert advice re risks / benefits, administer in hospital & avoid in first trimester
- Not recommended in children under 14 years – seek expert advice
- See PI re lactation, fertility, sodium content, paravenous leakage (may cause permanent staining)

- IV iron can cause hypersensitivity reactions (including anaphylactoid), which may be fatal & can occur after previous, uneventful doses. **Cardiopulmonary resuscitation facilities MUST be available.** Stop immediately if signs of allergy or intolerance. Observe for at least 30 min post infusion.

- Regular monitoring of FBE & ferritin for recurrent iron deficiency and iron overload is required. Assess underlying cause in ALL patients – refer to Clinical Update on Iron Deficiency Anaemia MJA 2010.

- Always consult full product information of IV iron product to be used, seek expert advice when required.

- Patient LEAFLET on IV iron given (www.sahealth.sa.gov.au/bloodsafe)

Completing MO

Name: Mobile/Pager:

Signature: Date: Designation/Unit:

Bloodsafe Resource Version 1.24/07/15, Public | A1 © Department for Health and Ageing, Government of South Australia. All rights reserved.



IV Iron Prescribing Checklist

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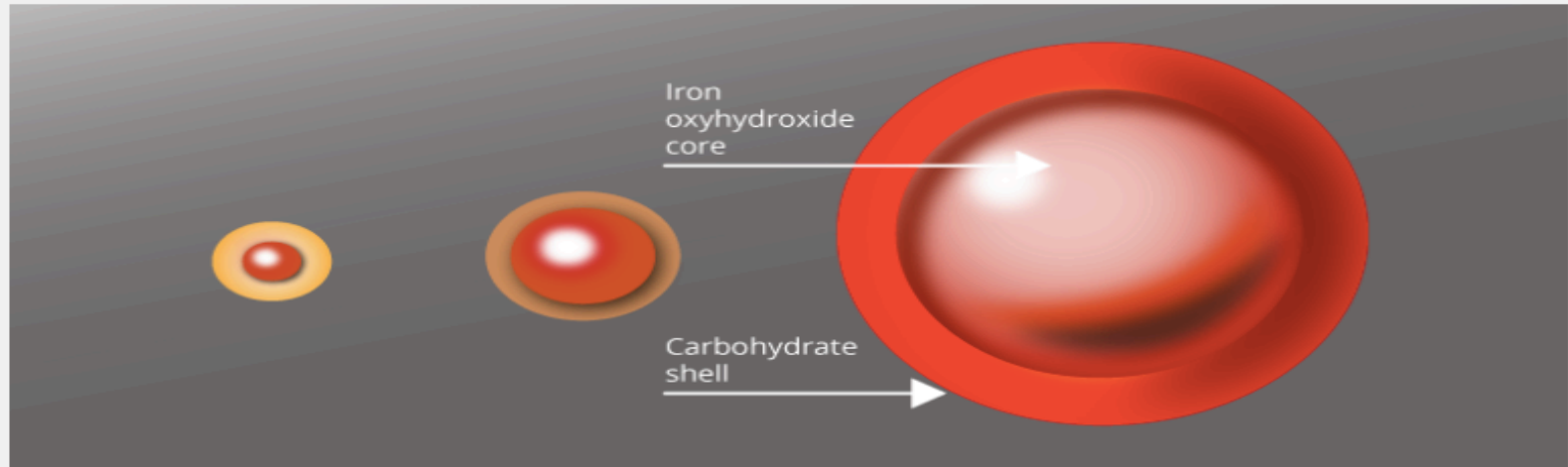
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Signature: Date: Designation/Unit:

Difference between IV iron preparations

IV iron preparations differ from each other by the size of the core, the type and density of the surrounding carbohydrate shell, and the overall molecular weight. Maximum dosage and infusion rates are specific to each product and are not interchangeable. The molecular weight of iron sucrose is 34–60 kDa, ferric carboxymaltose is 150 kDa and iron polymaltose is approximately 450 kDa.



Three different IV iron preparations

—————> Increasing molecular weight

Table 1. Total Iron Dose With the FCM Dose Regimen

Hb (g/dL)	Body weight <70 kg	Body weight \geq 70 kg
\geq 10	1000 mg	1500 mg
7–10	1500 mg	2000 mg

NOTE. Total dosage was administered in single infusions of 500 mg or 1000 mg iron as FCM. For patients with a body weight <67 kg, single doses of 500 mg were given.

FERGIcor, a Randomized Controlled Trial on Ferric Carboxymaltose for Iron Deficiency Anemia in Inflammatory Bowel Disease
GASTROENTEROLOGY 2011;141:846–853



Intravenous (IV) iron infusions

Why iron given by a drip into a vein is sometimes needed.

This leaflet answers some common questions about IV iron infusions. It does not contain all available information and does not take the place of talking to your doctor about why IV iron has been recommended in your particular case. Keep this leaflet. You may need to read it again.

What is an IV iron infusion?

"Intravenous" or "IV" means giving something directly into the blood stream of the body through a vein. A needle placed into a vein (usually in the back of the hand or arm) is attached to a drip that contains iron mixed with sodium (a usually salt water solution). This brown fluid is slowly "dripped" (infused) into the vein and mixes with the blood in your body.

Why is iron important?

Iron is essential for the body to make haemoglobin (Hb), a pigment that makes red blood cells red. When the amount of iron in the body gets too low, the haemoglobin level falls below normal. This is known as "iron deficiency anaemia".

Haemoglobin is very important as it carries oxygen from the lungs to the rest of the body. If your haemoglobin or iron levels are low this may make you feel tired and not able to carry out your normal routine.

Why might I need IV iron?

The most common way to treat iron deficiency anaemia is to take iron by mouth as a tablet or liquid. This works well for most people and is usually tried first.

IV iron might be needed if you are:

- Unable to tolerate iron tablets by mouth
- Unable to absorb iron through the gut
- Unable to absorb enough iron due to the removal of blood the body is losing
- In need of a rapid increase in iron levels to help avoid potential complications or a blood loss situation (such as, before or after major surgery, vaginal and menorrhagia, late in pregnancy or after delivery)
- Not responding to iron tablets (such as due to chronic health problems)
- Have chronic kidney or heart failure

Risks & benefits of IV iron

Your doctor will explain the benefits available in alternative possible cases. The IV iron is a small clear allergic reaction will be life threatening. Iron deficiency anaemia not tolerated, either quickly enough or outweigh the risk is there is a chance you may your doctor, avoided in the first.

Alternatives to

ORAL IRON: If you need absorb iron is best option that is most rapid increase needed). If you agree with iron but iron an iron oral daily or 2 or 3 times daily. Discuss the important that the given. If they see it on the stomach to iron in them to be not **ORAL:** liquid is not recommended course permanent discontinuation.

INJECT TRANSFUSION: The life saving the following is given than IV iron. It also an immediate iron needed (when **ORAL:** There is a possibility iron not enough iron back a diet that is high.

Intravenous (IV) Iron Infusions (continued)



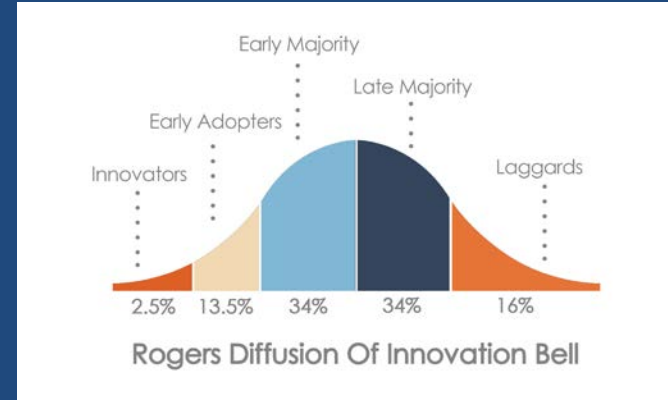
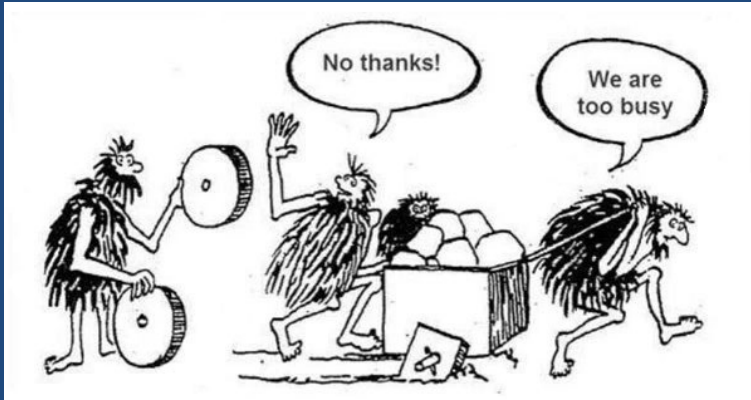
Department of Health and Ageing, Government of South Australia

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Thank-you



Meta-analysis of efficacy & safety of ferric carboxymaltose

- 14 studies with 2,348 randomised patients exposed to ferric carboxymaltose
- Anaemia secondary to CKD, blood loss in obstetric and gynae conditions, GI disease, heart failure
- 3 cohort studies
- Iron given up to the total iron deficit, to max of 1000 mg per week

Moore et al. BMC Blood Disorders 2011, 11:4

<http://www.biomedcentral.com/1471-2326/11/4>

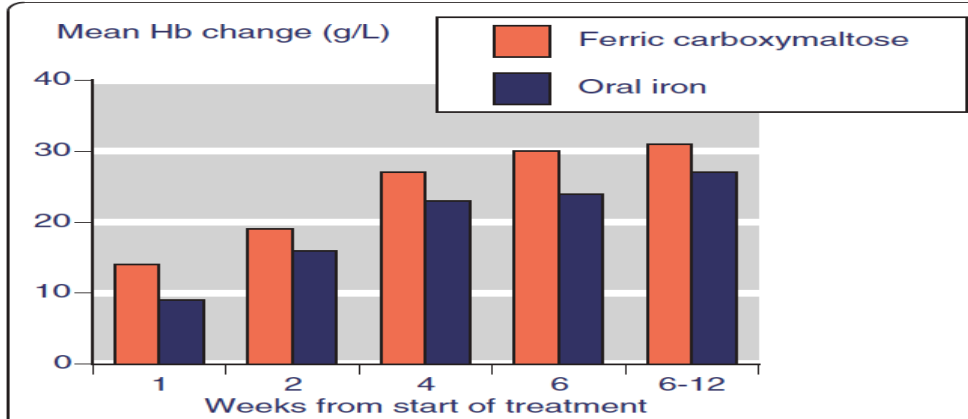


Figure 1 Time course for Hb changes.

Response was defined in various ways:
 Achieving target Hb increase (typically ≥ 20 g/L)
 Achieving a target Hb level (typically ≥ 120 g/L)

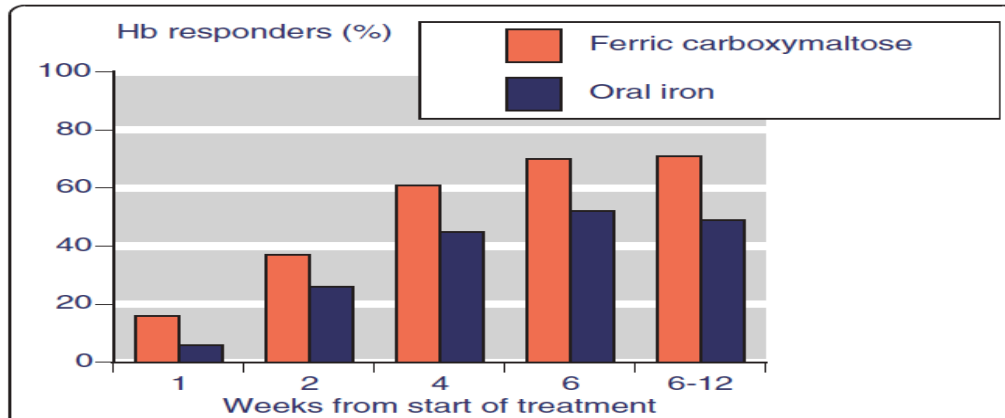


Figure 7 Time course of Hb responders.

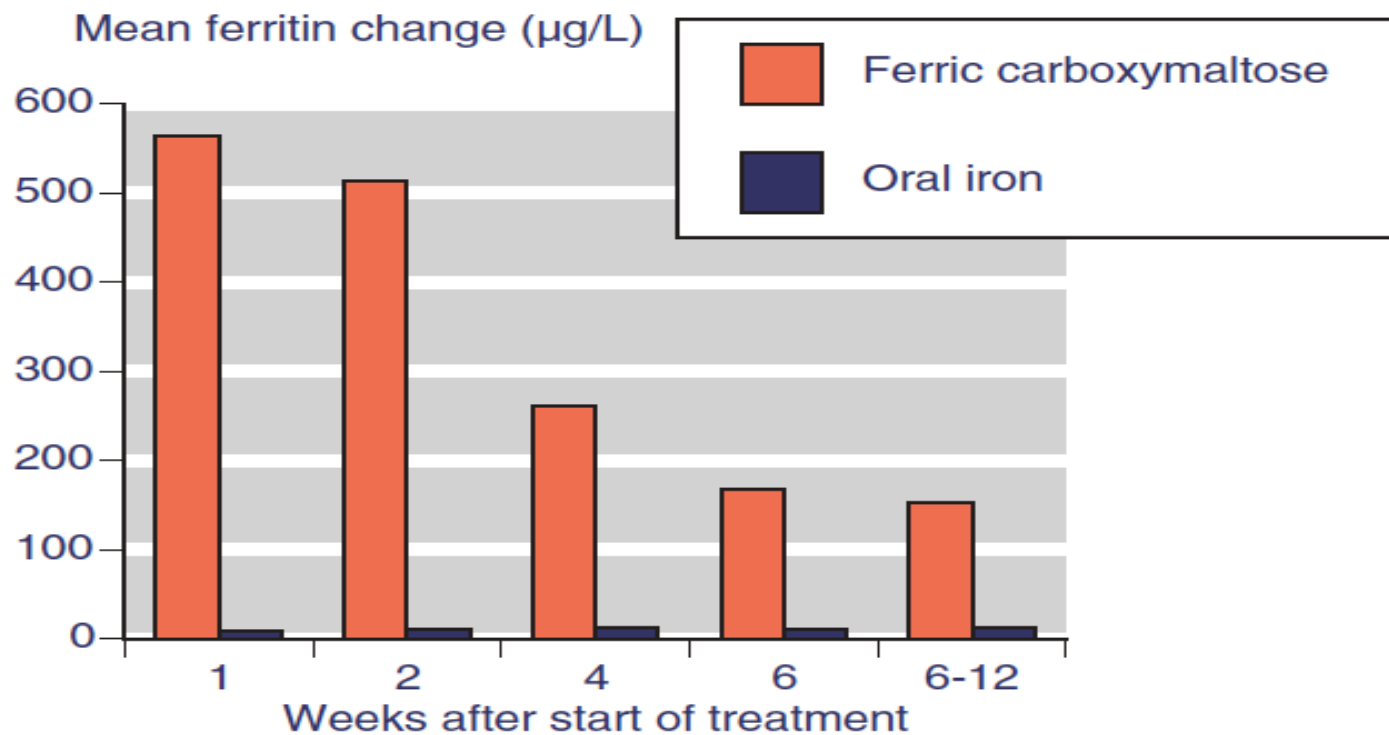


Figure 2 Time course for serum ferritin changes.

Table 4. Iron product–related adverse reactions ($\geq 1\%$ of study patients)¹

	Ferric carboxymaltose (<i>n</i> = 1,775)	Oral or IV iron comparator (<i>n</i> = 1,783)	Oral iron (<i>n</i> = 253)
Nausea	7.2%	1.8%	1.2%
Hypertension	3.8%	1.9%	0.4%
Flushing/hot flush	3.6%	0.2%	0%
Blood phosphorus decrease	2.1%	0.1%	0%
Dizziness	2%	1.2%	0%
Vomiting	1.7%	0.5%	0.4%
Injection-site discoloration	1.4%	0.3%	0%
Headache	1.2%	0.9%	0%
ALT increase	1.1%	0.2%	0%
Dysgeusia	1.1%	2.1%	0%
Hypotension	1%	1.9%	0%
Constipation	0.5%	0.9%	3.2%

Note: ALT = alanine aminotransferase; IV = intravenous.

National PBM Guidelines - Medical

Cardiac – chronic heart failure

Recommendation

R3

B

In patients with CHF, identification and treatment of iron deficiency (absolute and functional) is recommended to improve functional or performance status.

This is consistent with the 2011 Update to the National Heart Foundation of Australia and Cardiac Society of Australia and New Zealand *Guidelines for the prevention, detection and management of chronic heart failure in Australia, 2006*.

Note: The studies reviewed only included patients treated with IV iron and of NYHA functional classes II or III.

50 GP Educational Visits

- 82% individual visits, average 37 min
- 86% very interested in topic
- 94% believed pre-op anemia/ID role of GP
- 16% used IM iron, difficulties access to IV
- 42% did CRP but many unaware why, iron studies if microcytic
- 44% consulted haematologist, 36% pathology service for advice
- 84% prescribed a particular oral iron (therapeutic dose) although unaware of interactions
- Frustrating navigating referrals to hospitals