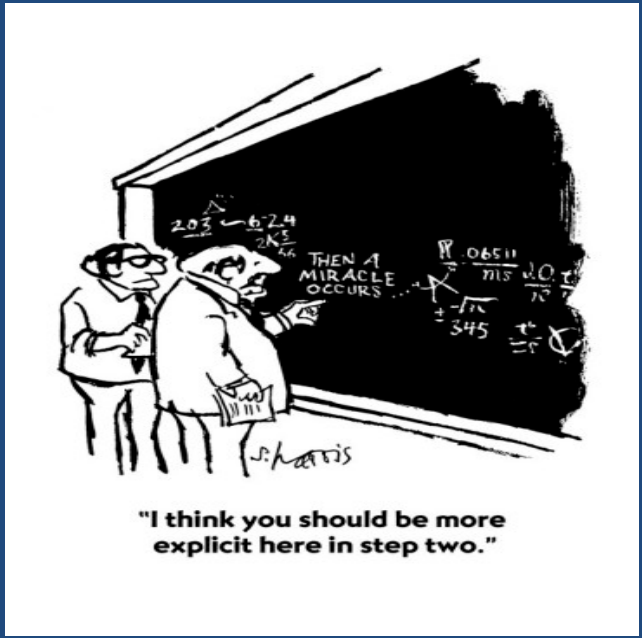


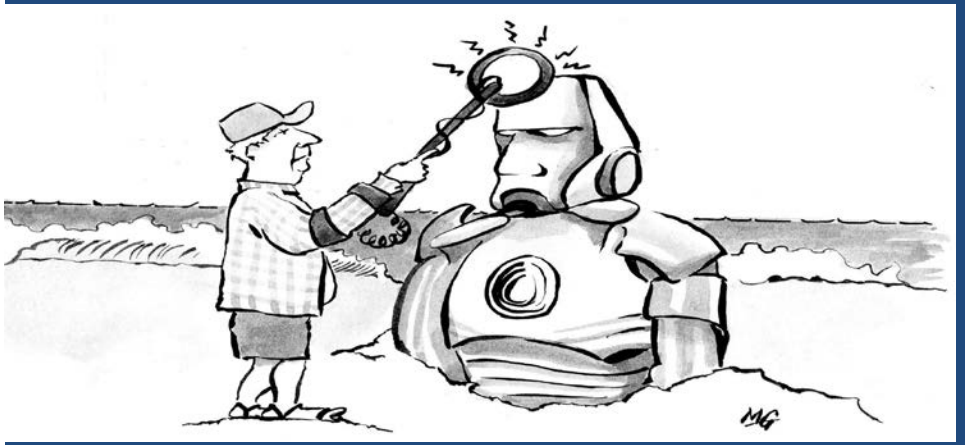
Update on the management of iron deficiency

Outline

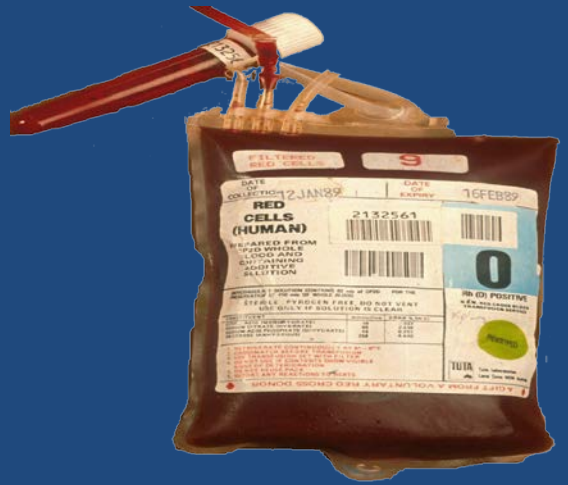
- Need to improve management & avoid transfusion
- Diagnosis & investigation
- Oral iron & IV iron
- Tools & resources

No conflicts of interest


SO, WE'VE DONE IRON TO DEATH. WHAT'S NEXT?
THE END OF THE IRON AGE.

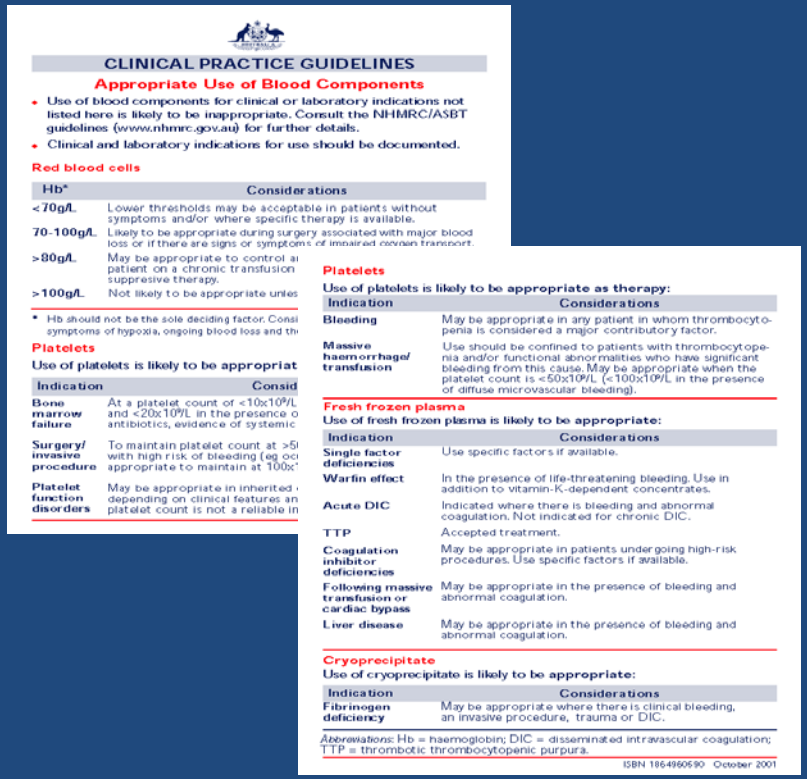

MG

“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 suppresive therapy.
>100g/L	Not likely to be appropriate unles

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

Platelets

Use of platelets is likely to be appropriat

Indication	Consid
Bone marrow failure	At a platelet count of <10x10⁹/L and <20x10⁹/L in the presence o antibiotics, evidence of systemic
Surgery/ invasive procedure	To maintain platelet count at >5 with high risk of bleeding (eg oc appropriate to maintain at 100x
Platelet function disorders	May be appropriate in inherited depending on clinical features an 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 <50x10⁹/L (<100x10⁹/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.
Warfin effect	In the presence of life-threatening bleeding. Use in addition to vitamin-K-dependent concentrates.
Acute DIC	Indicated where there is bleeding and abnormal coagulation. Not indicated for chronic DIC.
TTP	Accepted treatment.
Coagulation inhibitor deficiencies	May be appropriate in patients undergoing high-risk procedures. Use specific factors if available.
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

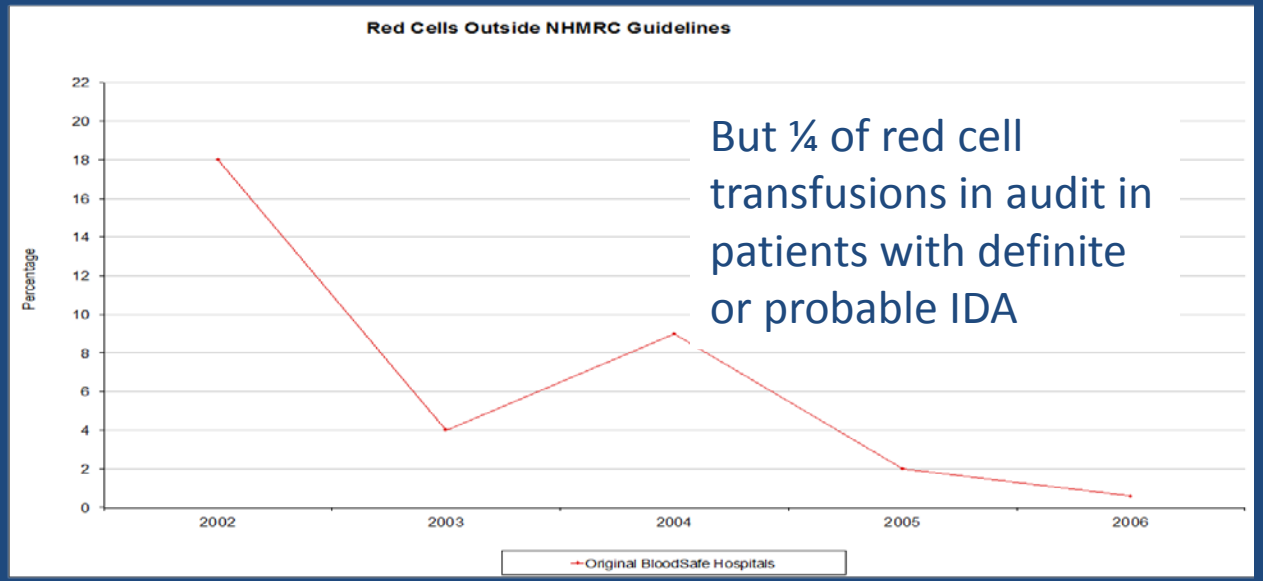
Use of cryoprecipitate is likely to be appropriate:

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

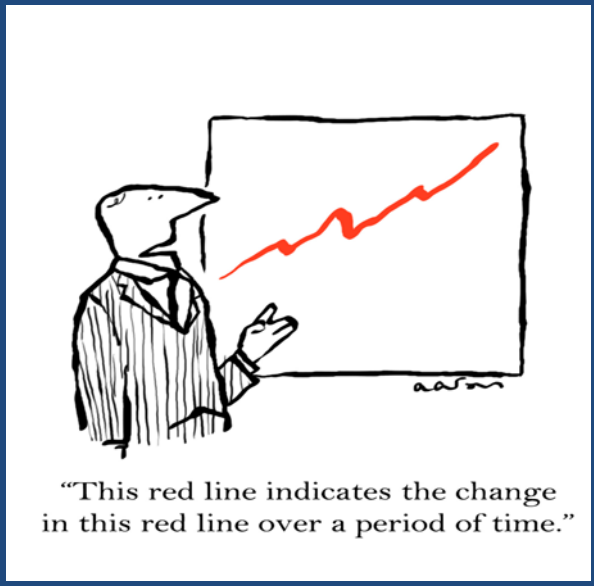
Abbreviations: Hb = haemoglobin; DIC = disseminated intravascular coagulation; TTP = thrombotic thrombocytopenic purpura.

ISBN 1864960590 October 2001

Transfusion outside NHMRC Guidelines



But ¼ of red cell transfusions in audit in patients with definite or probable IDA



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

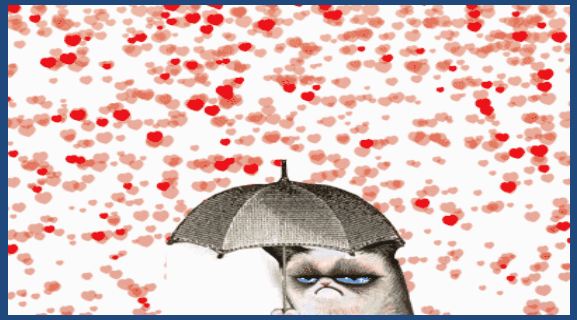
Doesn’t replenish deficient iron stores!

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

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.

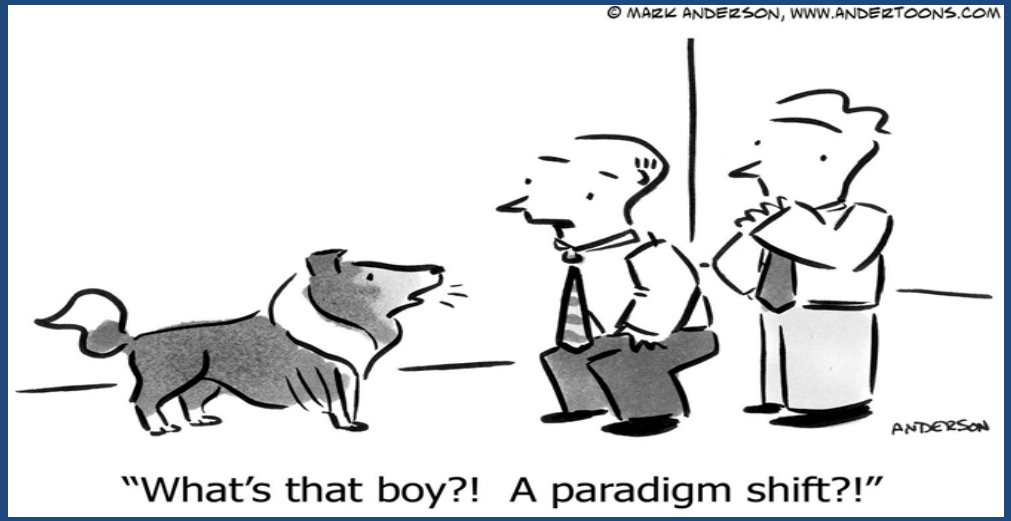
Module 2 Perioperative is intended to inform health-care practitioners, health educators, health service managers and policy makers about the pre, intra and postoperative care of patients undergoing surgery or invasive procedures, particularly those in which blood loss is anticipated.

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.

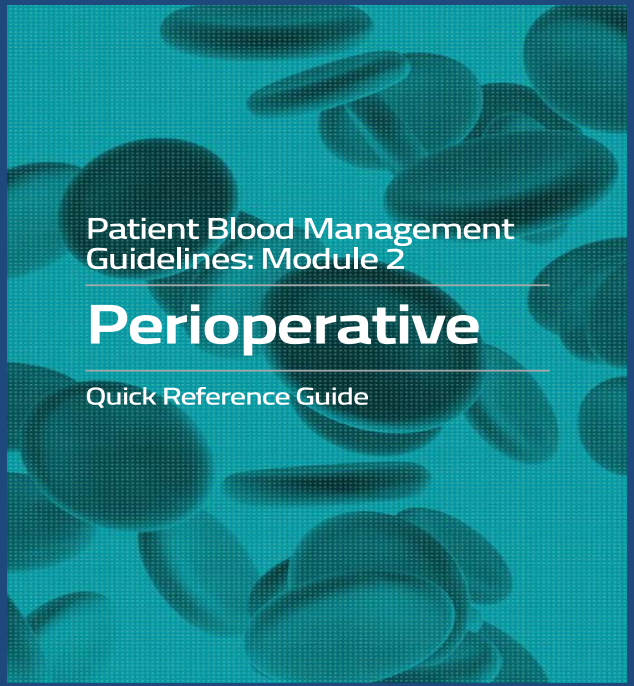
Module 5 Obstetrics and Maternity is intended to assist and guide health-care professionals in making clinical decisions when managing pregnant and postpartum women.

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.



Patient Blood Management Guidelines

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

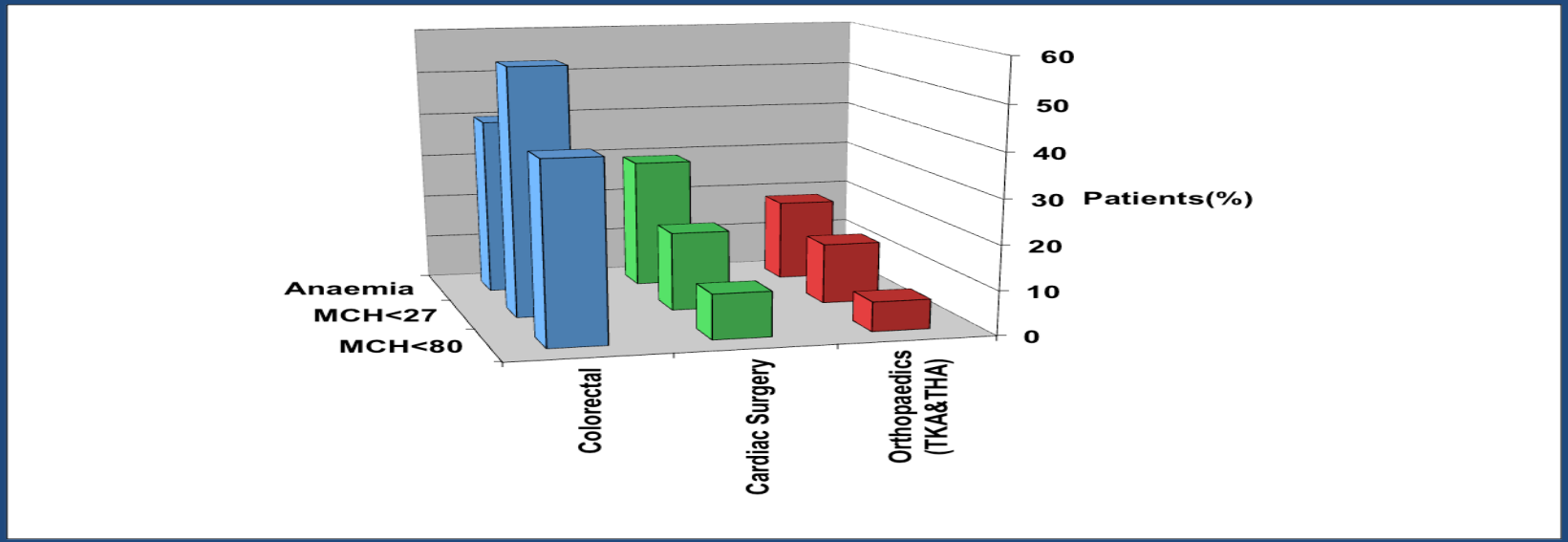


Ferritin >100 mcg/L

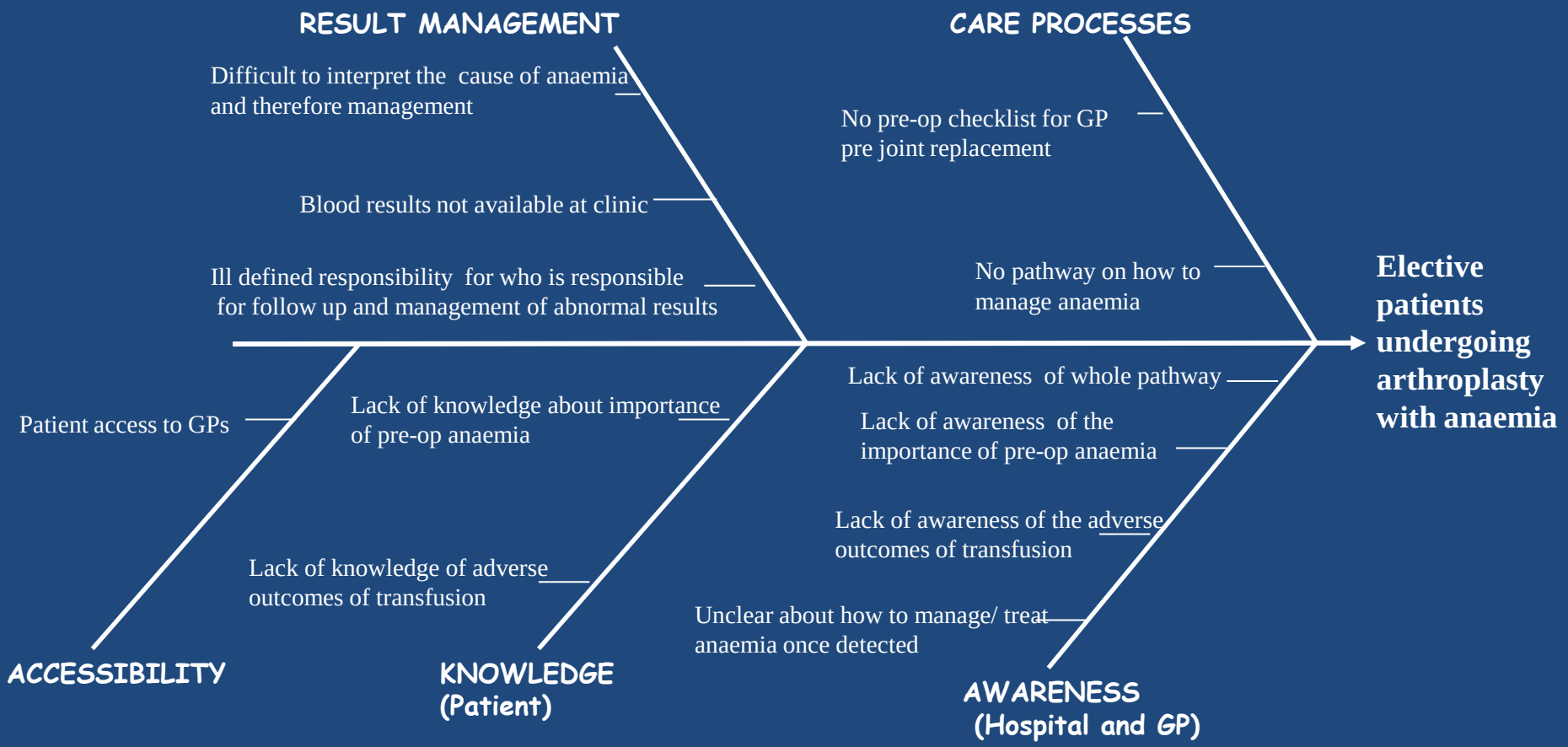
CRP[a]

nce of chronic kidney disease, renal advice

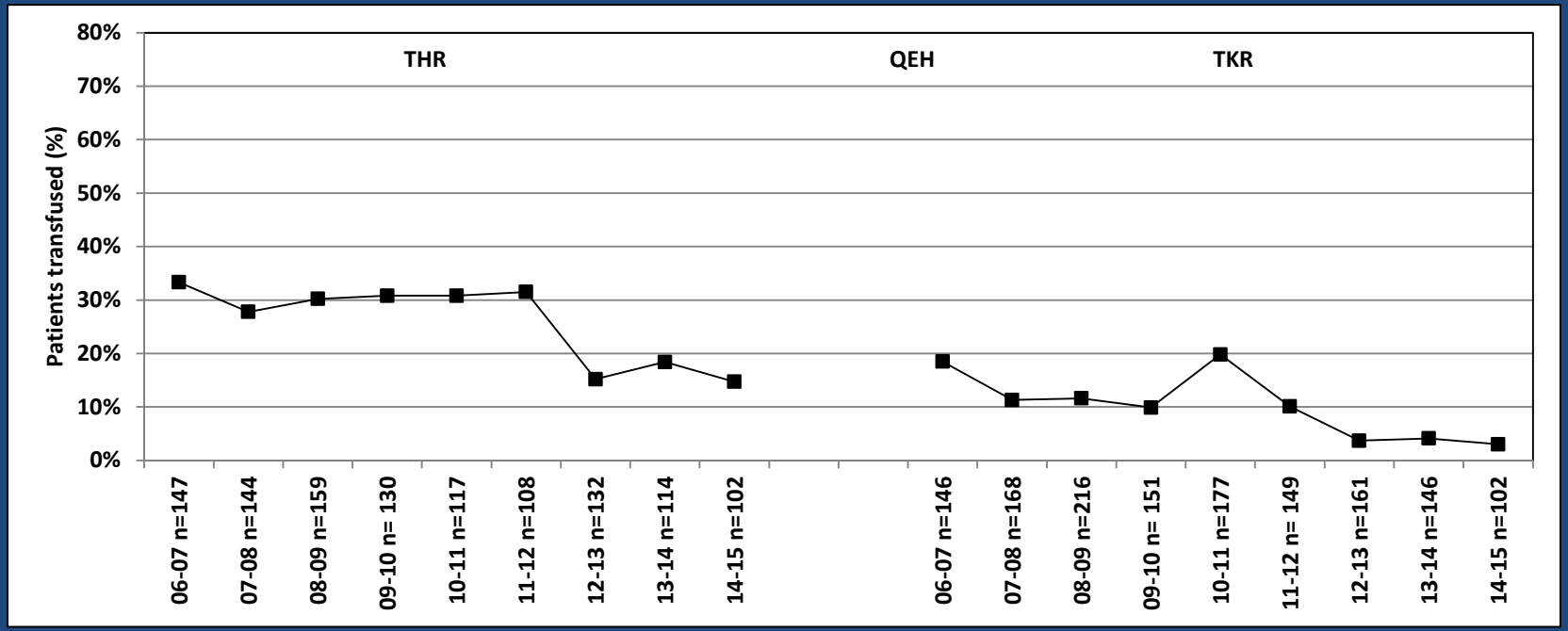
% Patients anaemic & with low red cell indices before elective surgery in SA 2008-10



Barrier Analysis: Cause & Effect Diagram



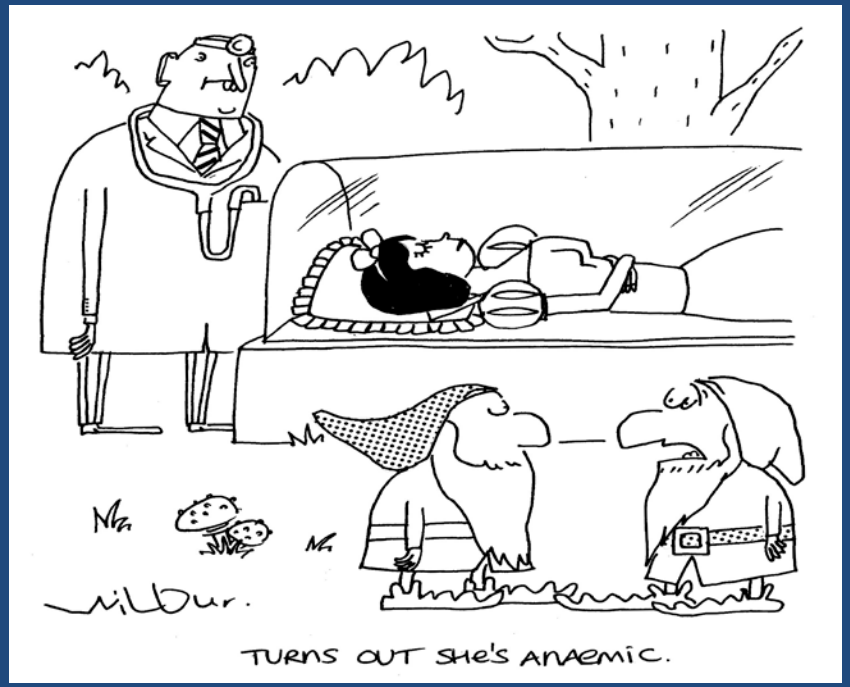
Transfusion rates 1^0 arthroplasty



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

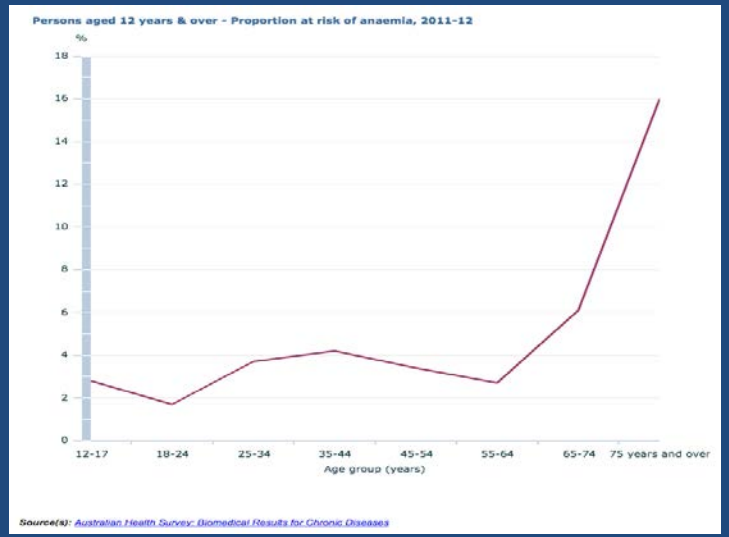


NHANES III 1988 – 1994

- 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

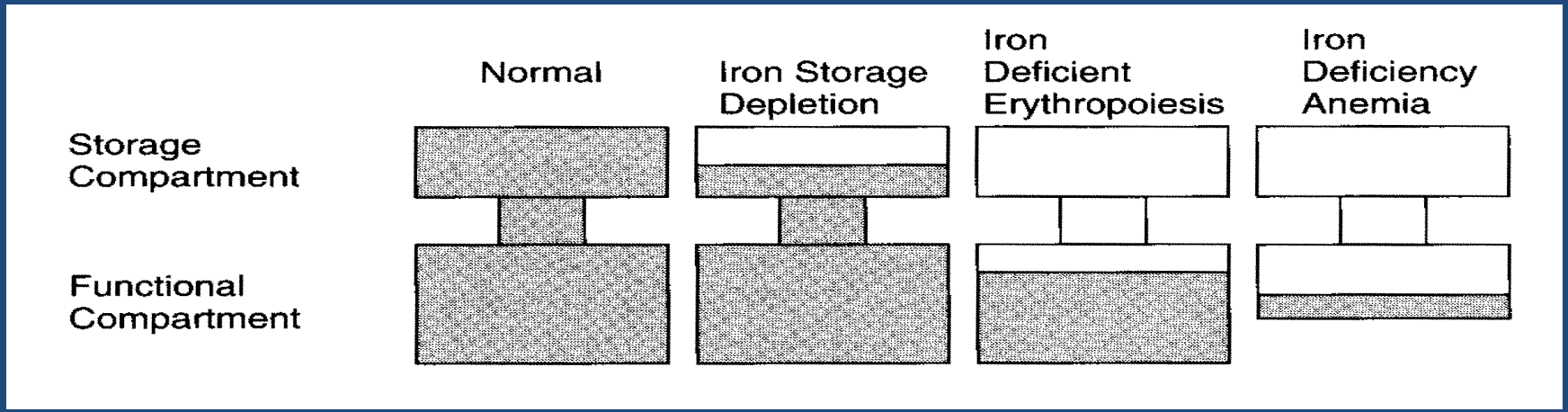
(low + normal Hb)

≤ 15 mcg/L = 8%

≤ 20 mcg/L = 12%

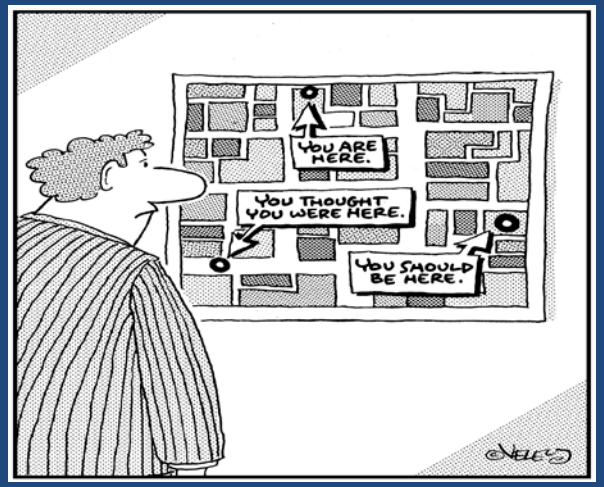
≤ 30 mcg/L = 22%

Changes with increasing iron deficiency



‘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

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The Medical Journal of Australia

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Clinical update

Diagnosis and management of iron deficiency anaemia: a clinical update

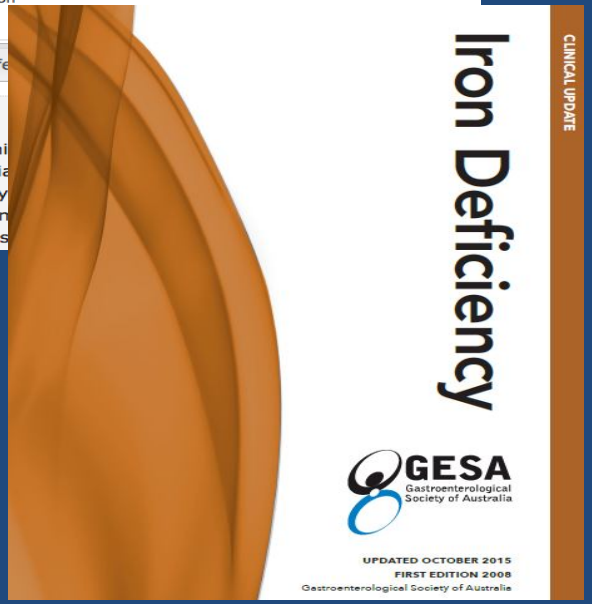
Sant-Rayn S Pasricha, Stephen C Flecknoe-Brown, Katrina J Allen, Peter R Gibson, Lawrence P McMahon, John K Olynyk, Simon D Roger, Helen F Savoia, Ramdas Tampi, Amanda R Thomson, Erica M Wood and Kathryn L Robinson

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

Article | Authors | Refe

Abstract

- Iron deficiency anaemi
  and worldwide, especia
- IDA may be effectively
  examination and serun
  not be used to diagnos



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*

ABSTRACT

he 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.

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 0.4g 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]

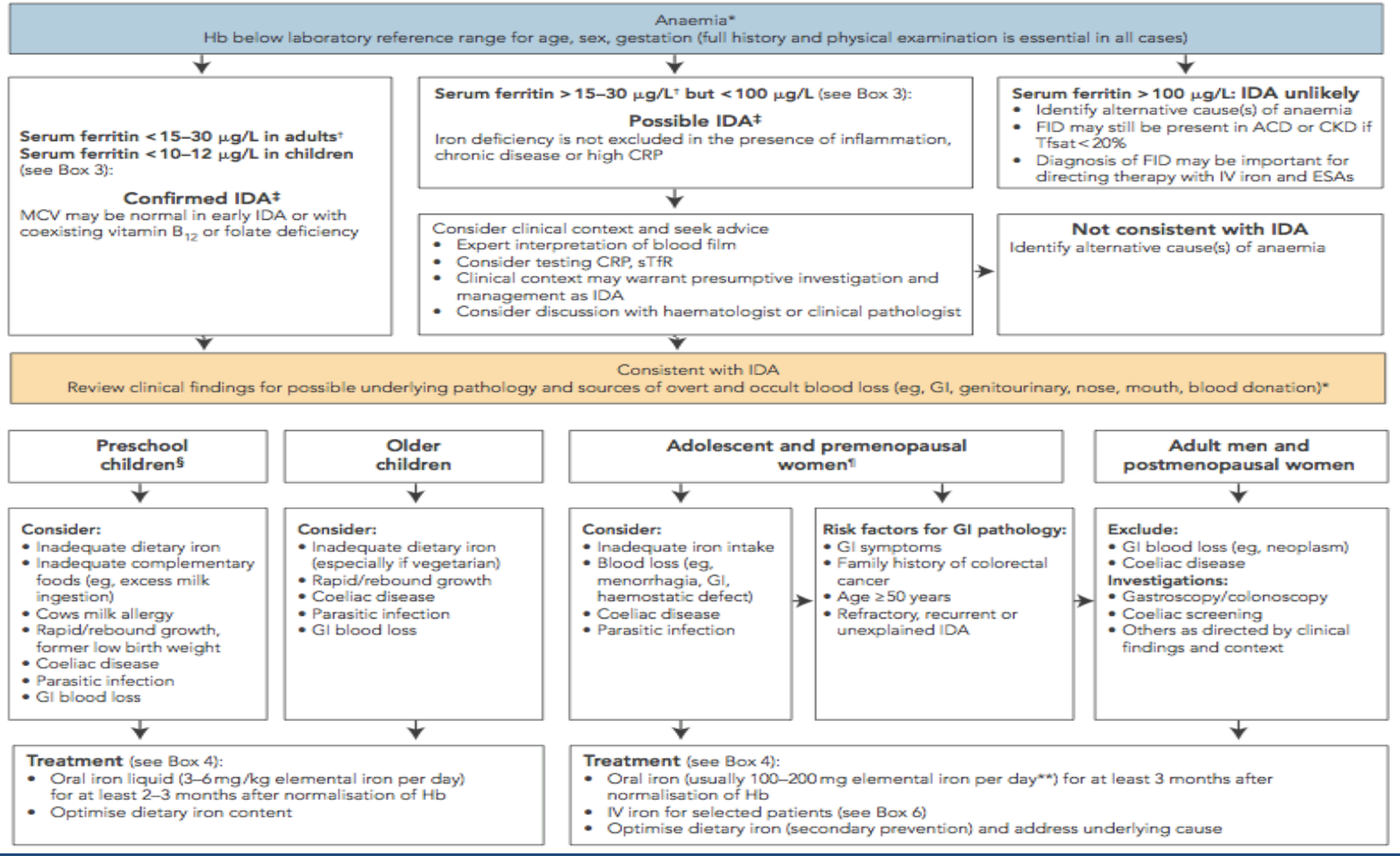
Iron absorption is upregulated by iron deficiency and increased erythropoiesis, and downregulated in inflammation and iron repletion, mediated by the recently described regulator of iron homeostasis, hepcidin, which blocks iron release from enterocytes and macrophages.[2] Body iron stores are regulated through iron absorption. Non-haem iron is best absorbed in the ferrous form (Fe^{2+}). Reduction of ferric iron (Fe^{3+}) 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

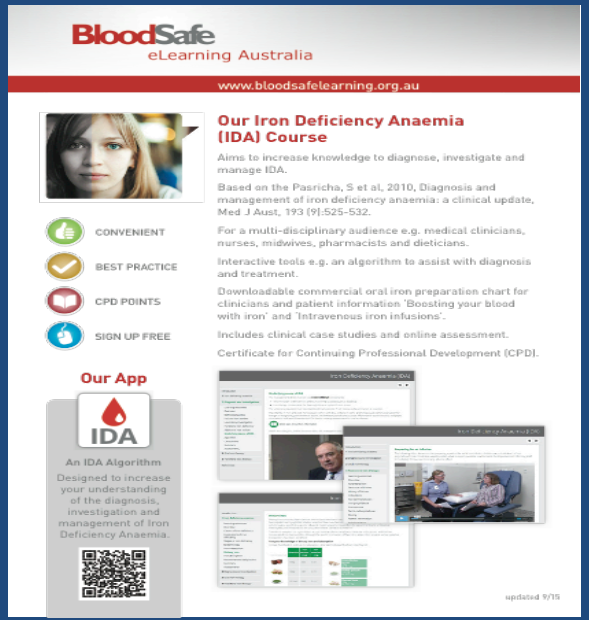
Iron deficiency results when iron losses or requirements exceed absorption, and is often multifactorial. It is common in children

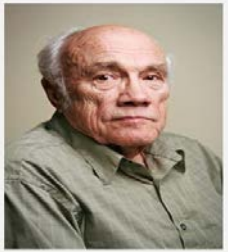
h priority. A writing group was formed to provide a clinical update specific for the Australian setting. •

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



www.bloodsafelearning.org.au





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.

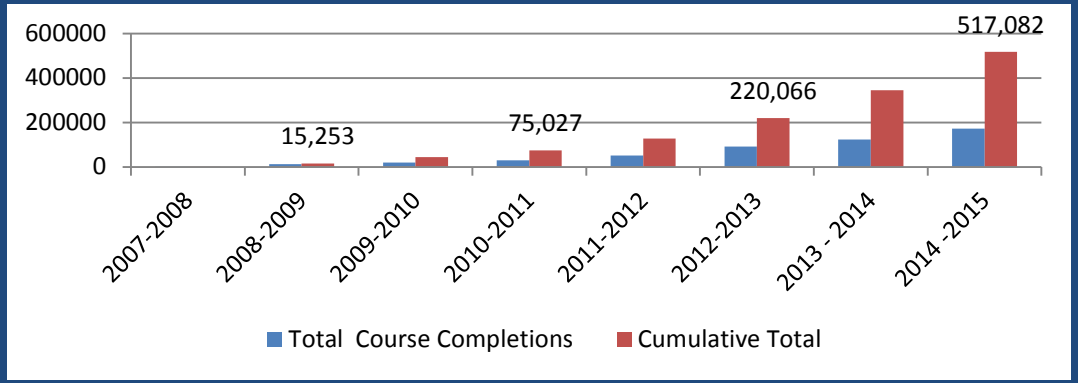
He was noted to have a Hb level of 96 g/L pre-procedure when the medical resident was completing the discharge summary 3 weeks later.

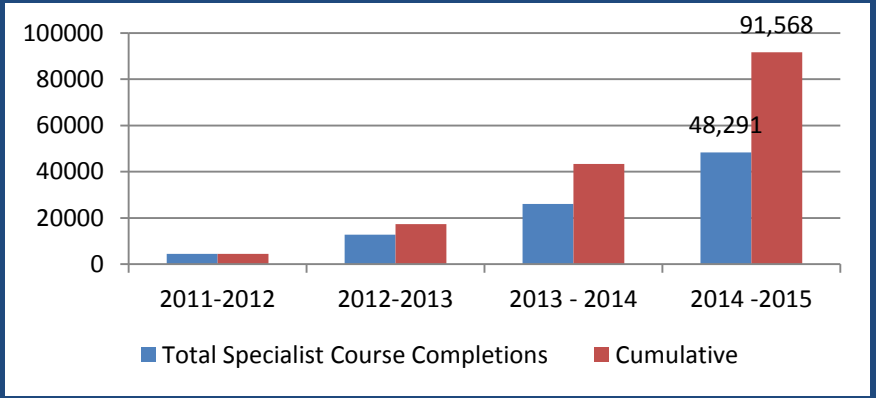
The day after the procedure the Hb was 89 g/L. The medical resident contacted the patient to check on his clinical status and arrange for a repeat FBE and iron studies.

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

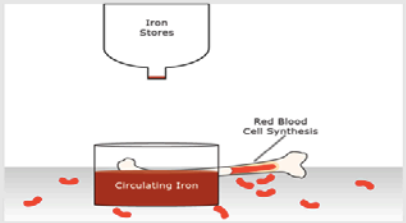
rning Australia





Use the tabs below to explore the stages of iron deficiency[1]

Iron stores are adequate | Iron stores falling | **Iron stores depleted** | Iron deficient red cell production | Iron deficiency anaemia



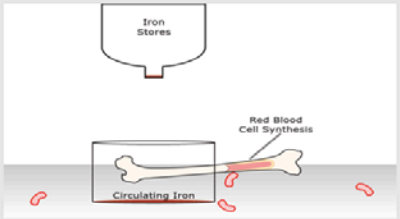
Iron stores depleted

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

IDA

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.

ANDROID APP ON Google play

Available on the App Store

IDA investigation and management algorithm tool

Is anaemia present?

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

Yes | No

Full history and examination is essential in all cases.

BloodSafe eLearning Australia

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.

BloodSafe eLearning Australia

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

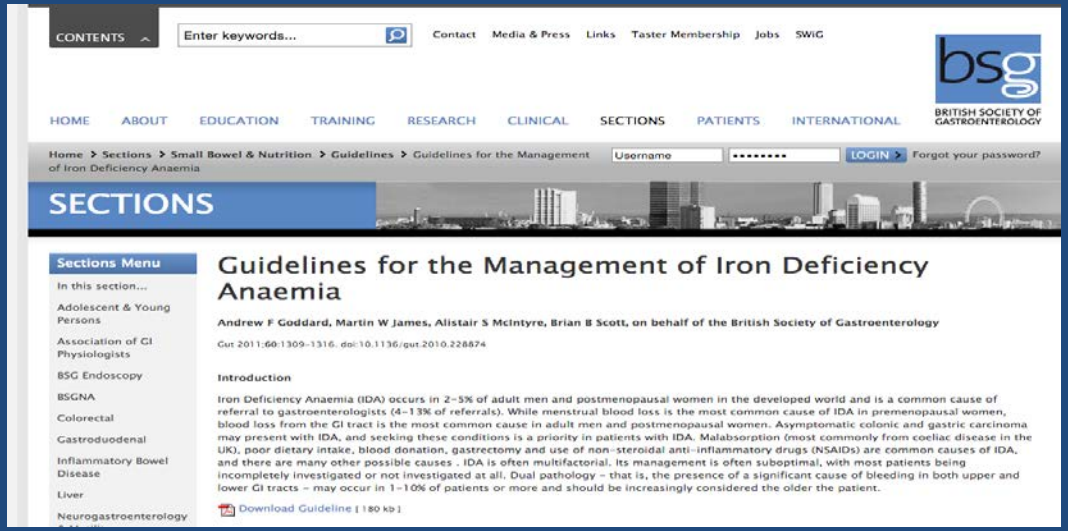
Treatment options

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

BloodSafe eLearning Australia

Look for a cause of iron deficiency in parallel to treatment



IDA investigation and management algorithm tool

Adolescent and premenopausal women

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.

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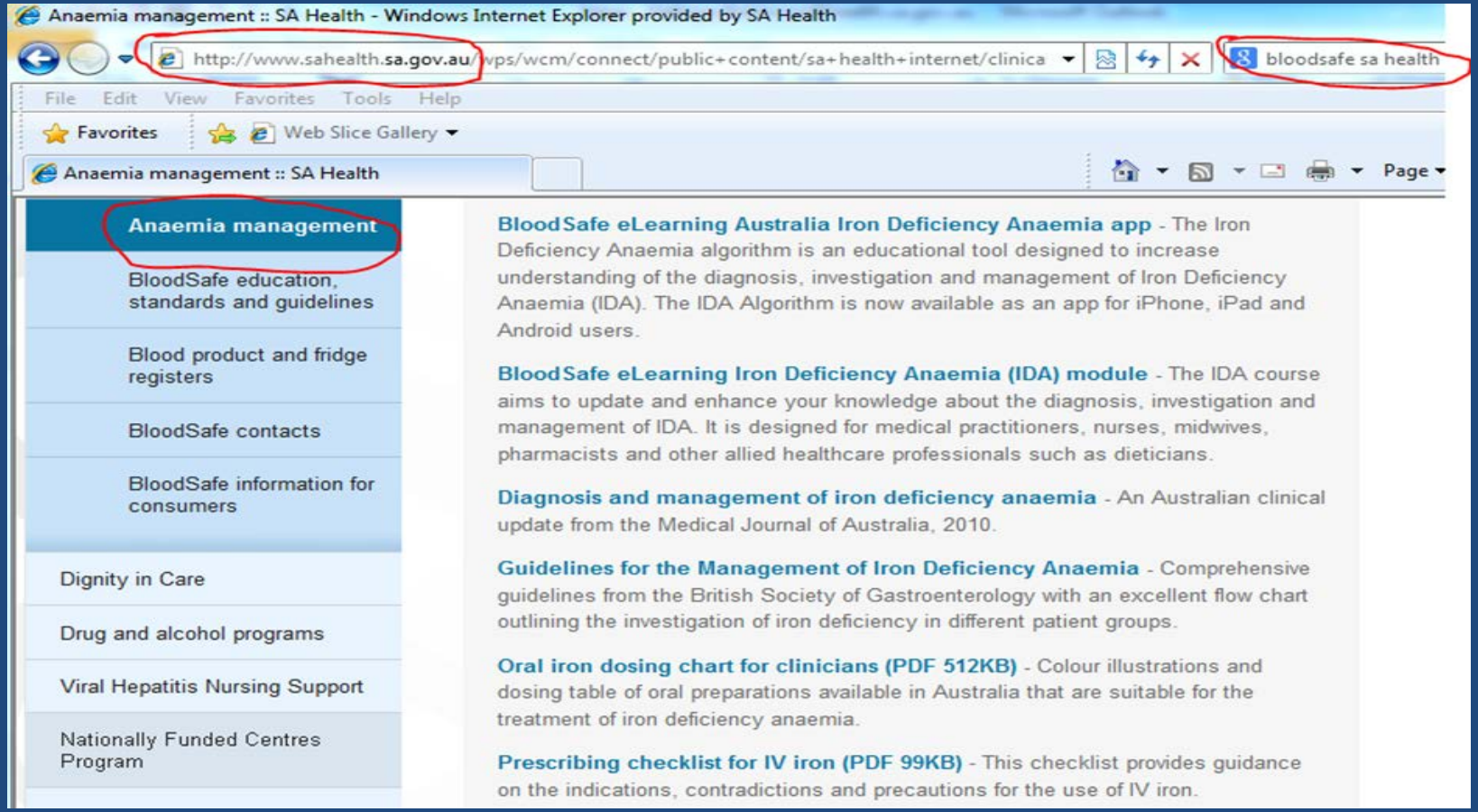
Anaemia management :: SA Health - Windows Internet Explorer provided by SA Health
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bloodsafe sa health
File Edit View Favorites Tools Help
Favorites
Web Slice Gallery
Anaemia management :: SA Health
Page
Anaemia management
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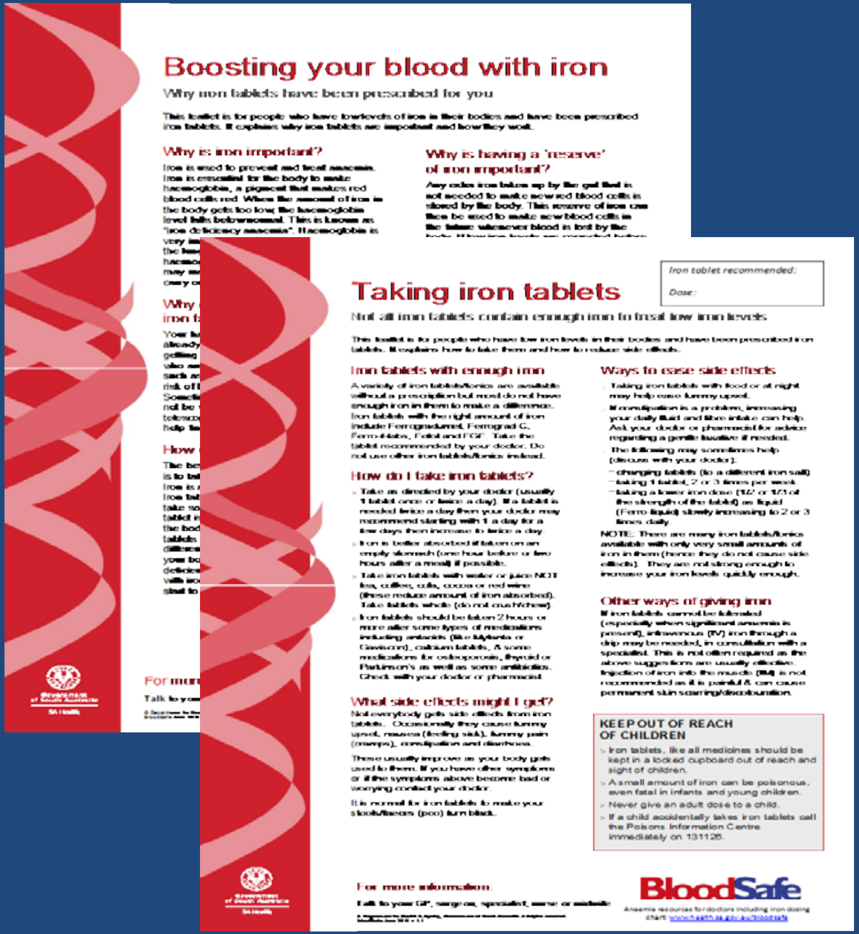
Blood product and fridge registers
BloodSafe contacts
BloodSafe information for consumers
Dignity in Care
Drug and alcohol programs
Viral Hepatitis Nursing Support
Nationally Funded Centres Program
BloodSafe eLearning Australia Iron Deficiency Anaemia app - The Iron Deficiency Anaemia algorithm is an 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. Due to variations in computer colour profiles, when printed or viewed on screen, colours of these tablets may not be a true representation.

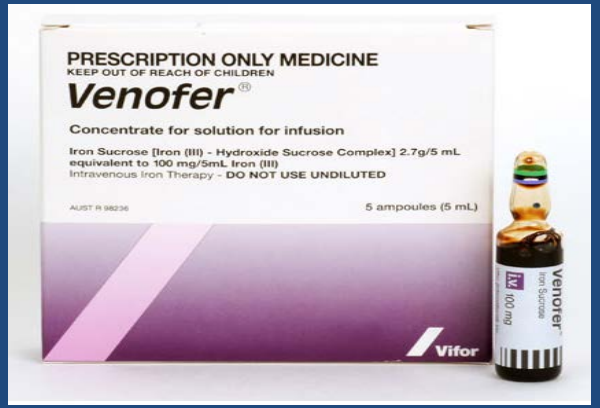
Maltofer (oral iron polymaltose) available in Australia since July 2015 – tablets (approx $26 per 30), syrup

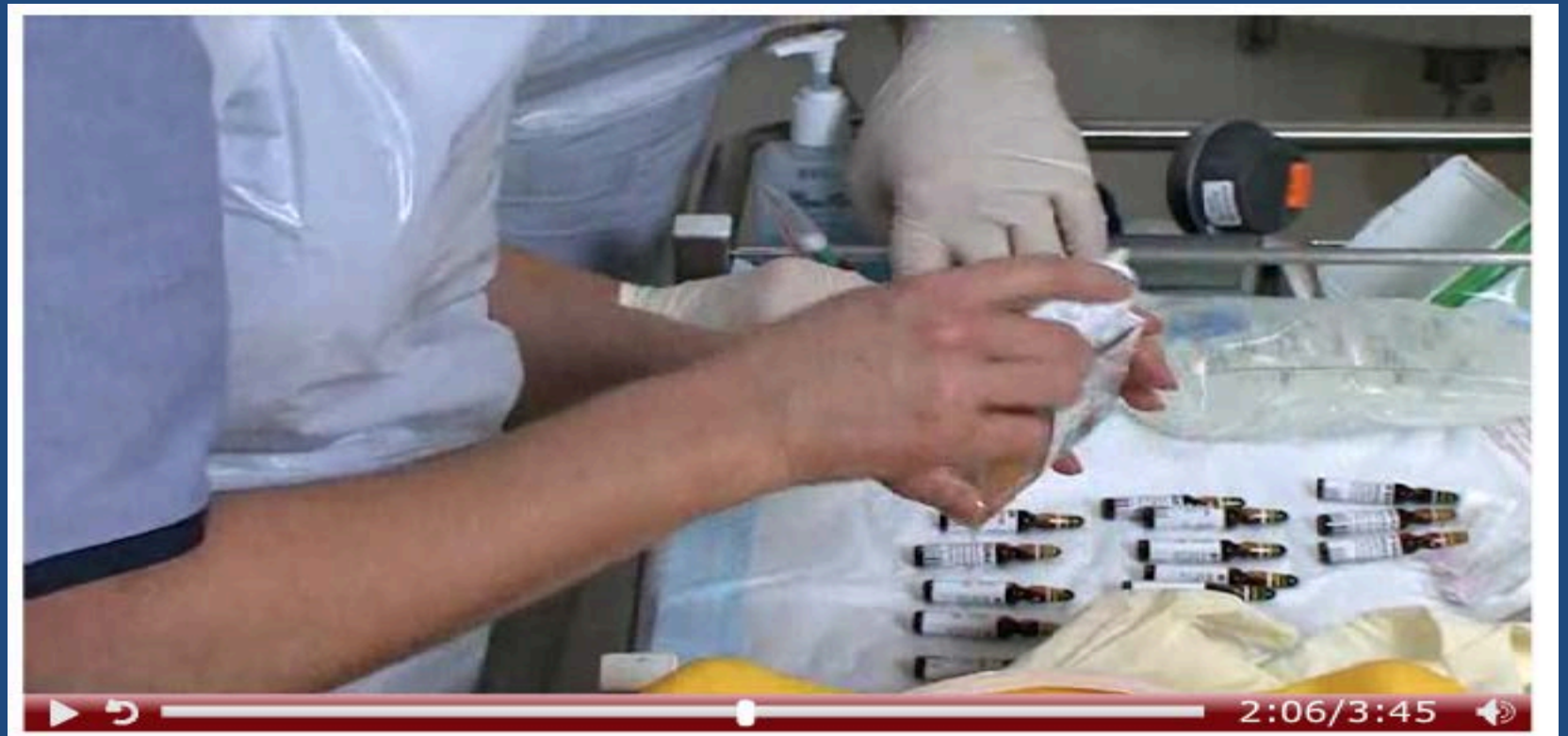


Translations available

IV Iron in Australia

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

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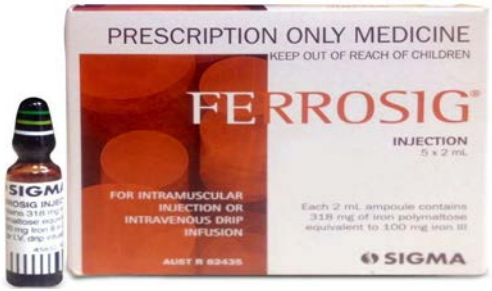
				arboxymaltose



IV Iron Prescribing Checklist

PATIENT LABEL

UR No.: .....

Name: .....

D.O.B. ..... Sex: .....

Doctor: ..... Ward: .....

INDICATION

***Confirmed Iron Deficiency Anaemia AND:**

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

- ☐ 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)

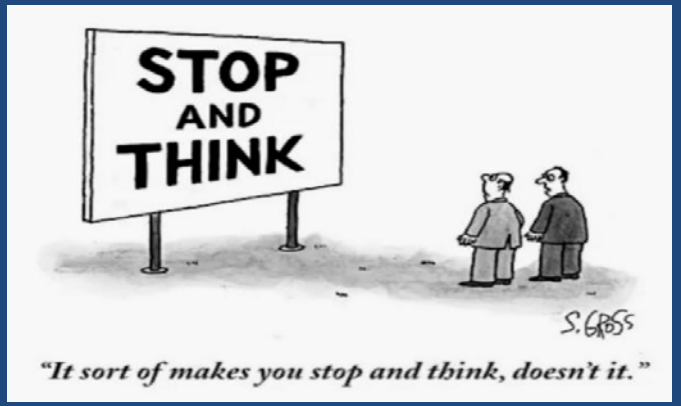
- IV iron can cause hypersensitivity reactions (including anaphylactoid), which may be fatal & can occur after previous uneventful doses: **Cardiopulmonary resuscitation facilities MUST be available.** Stop immediately if signs of allergy or intolerance. Observe for at least 30 min post infusion.
- Regular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



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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
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• 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)

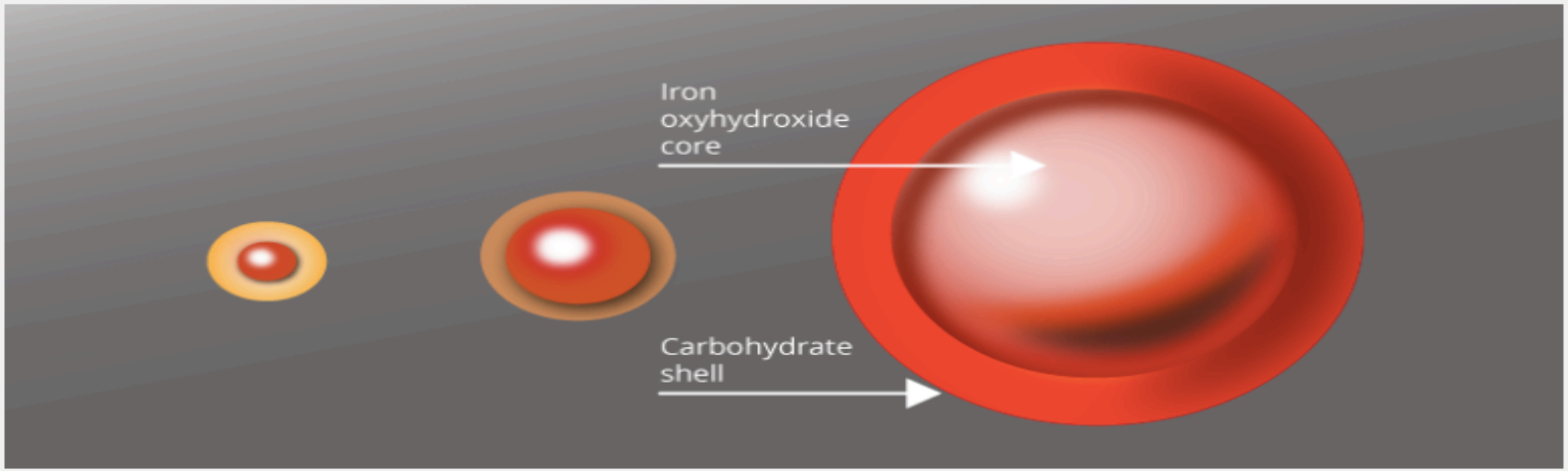
Completing MO

Name: ..... Mobile/Pager: .....

Signature: ..... Date: ..... Designation/Unit .....

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 ≥70 kg
≥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 kitchen salt) and water (solution). The 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 taken by mouth
- ☐ Unable to absorb iron through the gut
- ☐ Unable to absorb enough iron due to the amount of blood the body is losing
- ☐ In need of a rapid increase in iron levels to help avoid important complications or a blood transfusion (such as, before or after major surgery, significant anaemia 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 exp
available alternative
particular case. The
IV iron is a small ch
allergic reaction wh
be life threatening.
iron deficiency anae
not tolerated, effect
quickly enough & th
outweigh the risks a
there is a chance yo
inform your doctor,
avoided in the first t

Alternatives to

ORAL IRON: If yo
and absorb iron by
first option that sh
more rapid increa
needed). If you ge
upset with iron tab
iron as syrup (sus
slowly as tolerate
tablets 2 or 3 time
daily - discuss this
important that the
genes. Many iron t
on the stomach by
iron is taken to bre

IM IRON: Injection
is not recommend
cause permanent
discolouration.

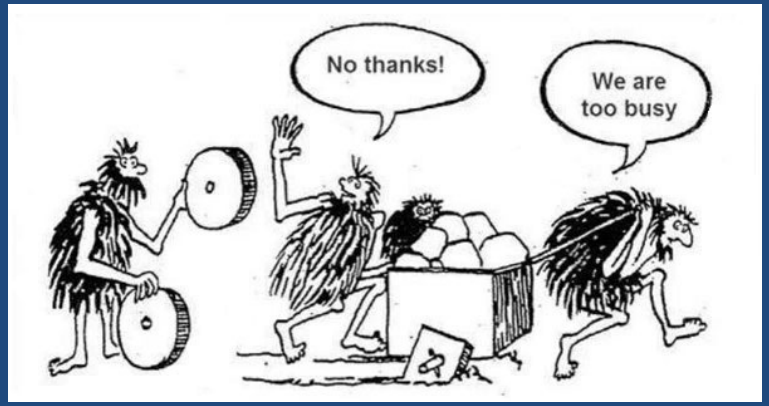
BLOOD TRANSFU
be life saving whe
bleeding is presen
than IV iron & take
an immediate incr
needed (when be

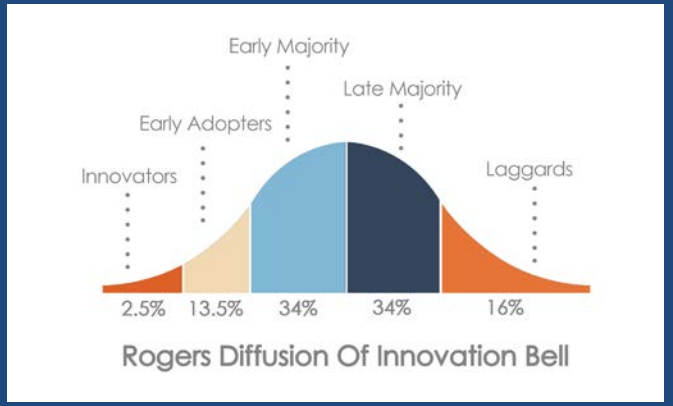
DIET: Once a per
low in iron and ma
enough iron back
a diet that is high

Intravenous (IV) Iron Infusions (continued)

Anaemia resources for doctors including iron dosing chart: www.sahealth.sa.gov.au/bloodsafe

Thank-you


No thanks!
We are too busy


Early Majority
Late Majority
Early Adopters
Innovators
Laggards
2.5%
13.5%
34%
34%
16%
Rogers Diffusion Of Innovation Bell

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

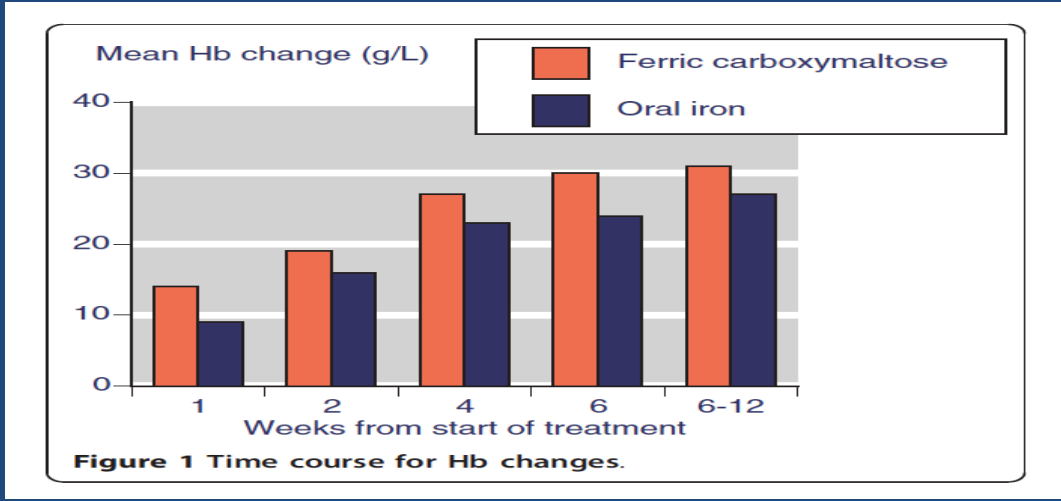


Figure 1 Time course for Hb changes.

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

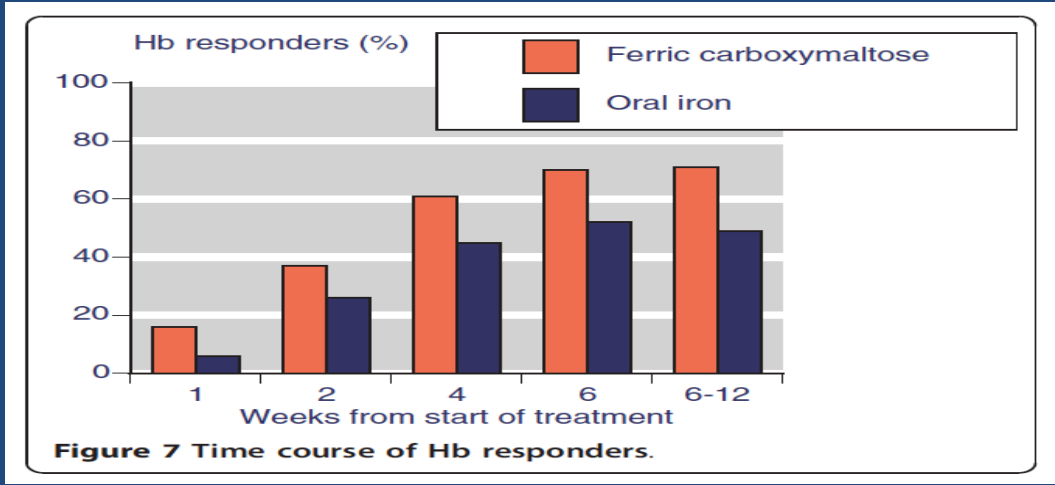


Figure 7 Time course of Hb responders.

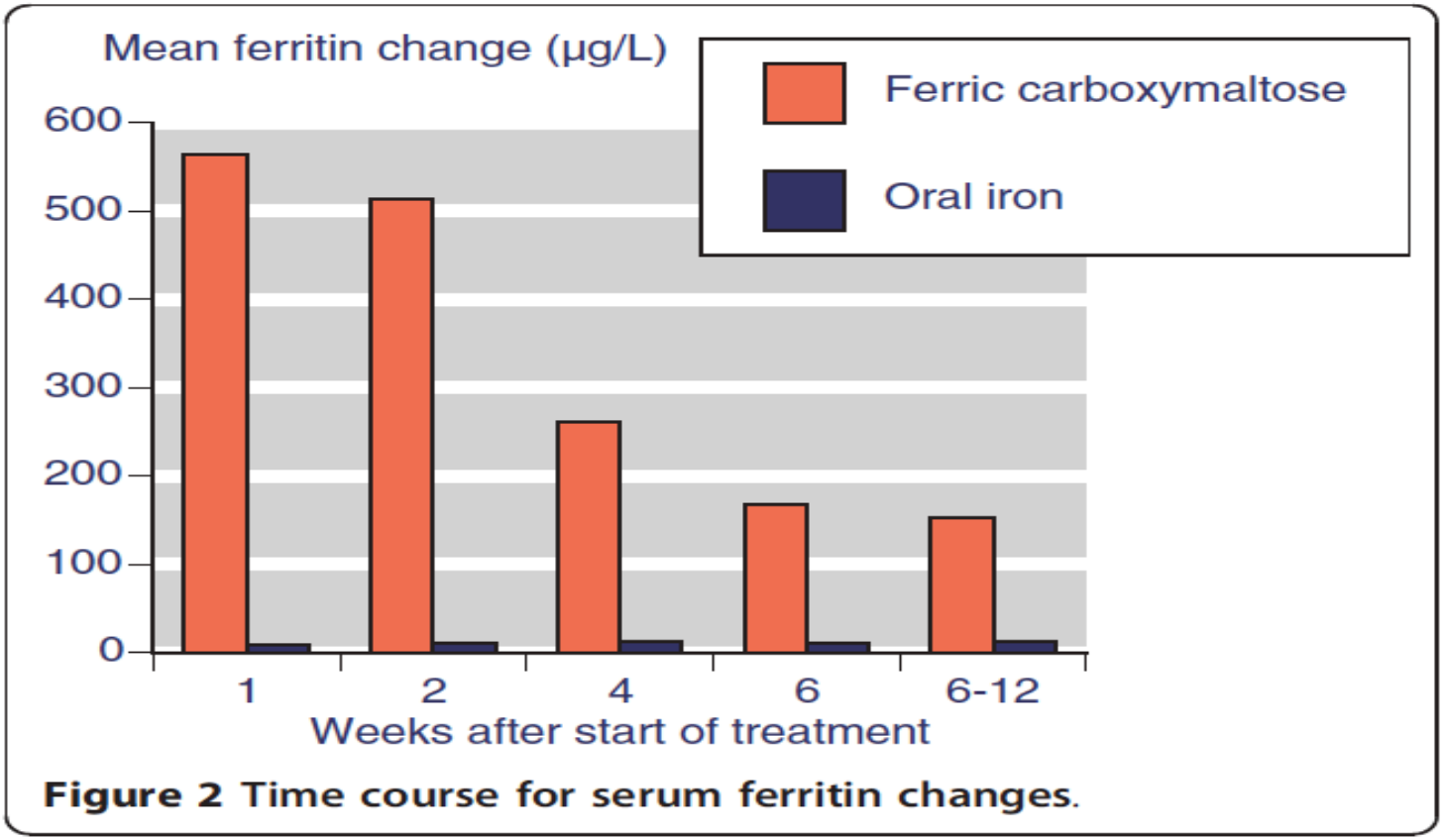


Figure 2 Time course for serum ferritin changes.

Table 4. Iron product–related adverse reactions (≥1% of study patients)[1]

	Ferric carboxymaltose (n = 1,775)	Oral or IV iron comparator (n = 1,783)	Oral iron (n = 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