

SCHEDULE 11: IRON SCREENING & IRON DEFICIENCY



Adapted from the Australian Institute of Sport (AIS) Iron Deficiency Best Practice Guidelines 2022.

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DOCUMENT CONTROL

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Responsible parties:	Dietitians, Doctors
Beneficiaries:	Contracted players and pathway players
Applicable settings:	All HP training, playing and clinical environments

RELATED DOCUMENTS & LINKS

Document Name	Location
AIS Iron Deficiency Best Practice Guidelines	AIS Iron Deficiency Best Practice Guidelines
AIS Sport Supplement Framework Iron- Practitioner Fact Sheet	AIS Sport Supplement Framework Iron
AIS Sport Supplement Framework Iron Infographic	AIS Sport Supplement Framework Iron Infographic

1. PURPOSE

These guidelines are intended to assist Australian Cricket (**AC**) medical staff and dietitians in the management of iron deficiency and any associated investigations required to assess the iron status of elite cricket players outlined in Section 2. The guidelines have been adapted from the [AIS Iron Deficiency Best Practice Guidelines](#)

2. SCOPE

2.1 These guidelines apply to the following players (collectively referred to as **Players**):

- All male and female Cricket Australia (**CA**) and State contracted players;

- b) All male and female players contracted to a male /female Big Bash League (W/BBL) Club
- c) All male and female pathway players selected in state and national age-group squads to participate in national championships (under 16 age-group squads or older).

3. RISK FACTORS FOR REDUCED IRON STATUS

- 3.1** Poor iron intake: poorly balanced vegetarian and vegan diets, chronic low-energy intake, disordered eating, and dietary patterns which see infrequent intake of red meat and inadequate substitution with other foods providing bioavailable iron.
- 3.2** High intakes of food combinations that reduce the bioavailability of dietary iron, particularly when it comes from plant sources. This includes high intakes of tannins (tea/ coffee), supplemental calcium and phytates (found in legumes, wholegrains, nuts and seeds) at meals in which iron-rich foods are eaten.
- 3.3** Poor iron absorption: clinical disorders such as coeliac disease, fat malabsorption, and the impact of hepcidin after exercise.
- 3.4** Increased iron requirements: menses (female athletes), growth spurts, pregnancy, accelerated erythropoiesis (exposure to altitude, high intensity endurance training).
- 3.5** Increased iron losses: gastrointestinal bleeding (e.g., ulcers, some non-steroidal anti-inflammatory drugs (NSAIDs), excessive haemolysis due to increased training stress (e.g., foot strike haemolysis), sweat losses and other blood losses (e.g., surgery, nose bleeds).

4. WHEN SHOULD INVESTIGATION OF IRON STORES BE CONSIDERED?

- 4.1** Players with insufficient or deficient iron stores are mostly asymptomatic and only identified via screening with a blood test.
- 4.2** In the absence of symptoms, at risk players (i.e. those listed in the section above) iron testing should be considered at the following times:
 - a) annual screening for contracted female players at the conclusion of the season to ensure management can be optimised during the offseason, before periods of intensified training,
 - b) unintentional/unexplained significant weight loss,
 - c) prior to departure for extended overseas Tours where diagnosis and intervention can be more problematic,
 - d) previous history of iron depletion, or
 - e) unexplained fatigue.

Iron deplete players may occasionally present with some, or all, of the following symptoms, particularly as they regress towards stage 3 iron deficiency: frequent illness, lethargy and fatigue, underperformance, loss of power, “jelly legs”, “light headedness”, restless legs when sleeping, loss of endurance, decreased motivation to train, poor mood.

These players should also be assessed at the discretion of the Australian Cricket (AC) Medical Officer (MO). Any iron screening should be conducted first thing in the

morning, following a rest day (aim for 24h no exercise leading up to the blood test), with no signs of sickness or infection.

4.3 Given biological and analytical factors can affect ferritin and haemoglobin levels AC MOs are guided to the following framework when contemplating the standardisation and frequency of iron blood screening for players (from Sim et al., 2019):

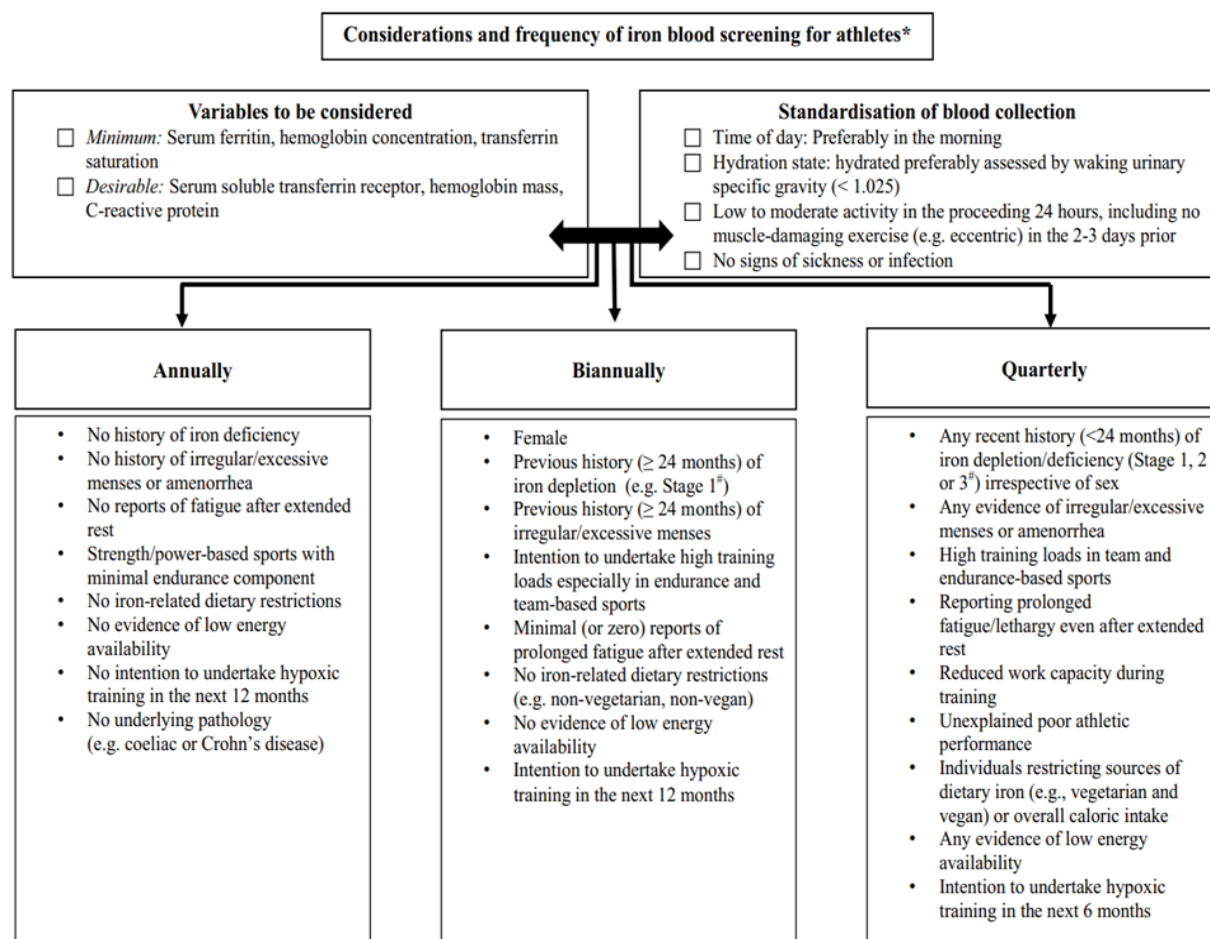


Fig. 1 Framework of considerations for the frequency of iron blood screening in athlete populations. Asterisk indicates this framework requires the expertise of trained professionals including sports phy-

sicians, dietitians and physiologists. # indicates stages of iron deficiency are defined by Peeling et al. (2007)

5. STAGES OF IRON DEFICIENCY

5.1 All stages of iron deficiency can affect performance and therefore should be treated.

STAGE	TYPICAL LABORATORY PROFILE
Stage I: Iron Deficient Non-anaemia	Serum Ferritin <35µg/L Soluble Transferrin Receptor (sTfR) <2.5mg/L Transferrin Saturation >16% Haemoglobin (Hb) – women >120g/L Haemoglobin (Hb) – men >135g/L

Stage II: Iron Deficient Non-anaemia	Serum Ferritin <20µg/L Soluble Transferrin Receptor (sTfR) >2.5mg/L Transferrin Saturation <16% Haemoglobin (Hb) – women >120g/L Haemoglobin (Hb) – men >135g/L
Stage III: Iron Deficiency Anaemia	Serum Ferritin <12µg/L Soluble Transferrin Receptor (sTfR) >2.5mg/L Transferrin Saturation <16% Haemoglobin (Hb) – women <120g/L Haemoglobin (Hb) – men <135g/L

6. MEDICAL AND NUTRITION ASSESSMENTS AFTER DIAGNOSED DEFICIENCY

6.1 It is essential to investigate the underlying cause of the deficiency and to exclude significant underlying pathology.

AC MEDICAL OFFICER	AC SPORTS DIETITIAN
<i>History:</i> - Blood loss - Menstrual history - Other symptoms specific to haematological disorders - Fatigue - Overreaching/under recovery syndrome - Change in mood/motivation - Large change in training load - Under-performance (training/competition) - Illness/infection - Disordered eating - Altitude training - NSAID use - Stool changes - Clinical examination: - Signs of anaemia - Malabsorption syndromes - Haematology tests: - Full blood count - Iron studies - Decrease in haemoglobin mass - Other clinically indicated tests: - Coeliac screen - Micronutrient assays (e.g.: vitamin B, folate)	<i>Dietary Assessment:</i> - Total energy intake/energy availability - Total dietary iron intake - Sources of iron (haem vs. non-haem) - Total energy intake / energy availability - Co-ingestion with other foods (absorption inhibitors / enhancers) - Timing of high iron meals relative to key exercise sessions (impact of hepcidin) - Iron supplementation, including daily dose and distribution over the day

7. TREATMENT

7.1 Treatment(s) for an iron deficiency depend on the severity of the issue and the player's history, and include nutritional support, oral iron supplementation, and intravenous iron approaches. The treatment approach should be directed by the AC MO in

consultation with The AC Sports Dietitian. The following approaches might be considered (as a guide):

Treatment	Indication	Considerations
Food Approach	Ferritin: 35-50 ug/L Normal haemoglobin	In consultation with an AC Sports Dietitian, increase iron intake via food choices, verify energy and carbohydrate availability, and avoid "iron inhibitors" while consuming high-iron foods to maximise iron intake
Oral Iron Supplementation*	Ferritin: 20-35 ug/L Normal haemoglobin	Supplementation for 8-12 weeks with ~100mg elemental iron provided in the morning, daily, or every second day if gastrointestinal upset occurs with the supplement
Intravenous Iron Approach**	Ferritin: <20 ug/L Compromised haemoglobin	Intravenous iron should only be considered in consultation with an AC MO. Note: efficacy of this approach appears best when iron deficiency anaemia is present i.e. low ferritin stores and compromised haemoglobin mass. Iron is not prohibited by WADA but if the amount of fluid used to give the infusion is >100ml then a Therapeutic Use Exemption is required. If less than 100ml is used, then no Therapeutic Use Exemption is required.

***ORAL IRON SUPPLEMENTATION:**

- a) Products based on ferrous salts are preferred over ferric iron.
- b) Combination oral supplements with iron (~100mg) and vitamin C (325mg/500mg) are recommended:
 - (I) If vitamin C is not present in the oral supplement, consume with a dietary source of vitamin C (e.g. citrus fruit or juice).
- c) Dose: 100 -200mg elemental iron daily or on alternate days.
- d) Ideally supplements should be taken on waking prior to food. However, some players may experience gastrointestinal discomfort / complaints which may be alleviated if tablets are consumed with food. ***Note that some food sources can inhibit absorption of iron (e.g. phytates, polyphenols, calcium, zinc, manganese).
 - (I) Consumption of calcium (dairy) and tannins (tea and coffee) is recommended to be avoided an hour either side of consumption of supplement.
- e) Consumption of iron supplements in the hours after intense exercise should be avoided due to the impact of hepcidin reducing absorption.
- f) Players **should not** be encouraged to take iron supplements "just in case". Excess iron intake may lead to iron overload.
- g) If a player experiences negative gastrointestinal outcomes as a result of consuming the oral iron supplement the following changes should be trialed: consume with food ***, a lower dose supplement, enteric coated supplements, every 2nd day supplementation.

- h) Prescription and provision of oral iron supplements provided must adhere to the AC Supplement Policy.

****INTRAVENOUS IRON**

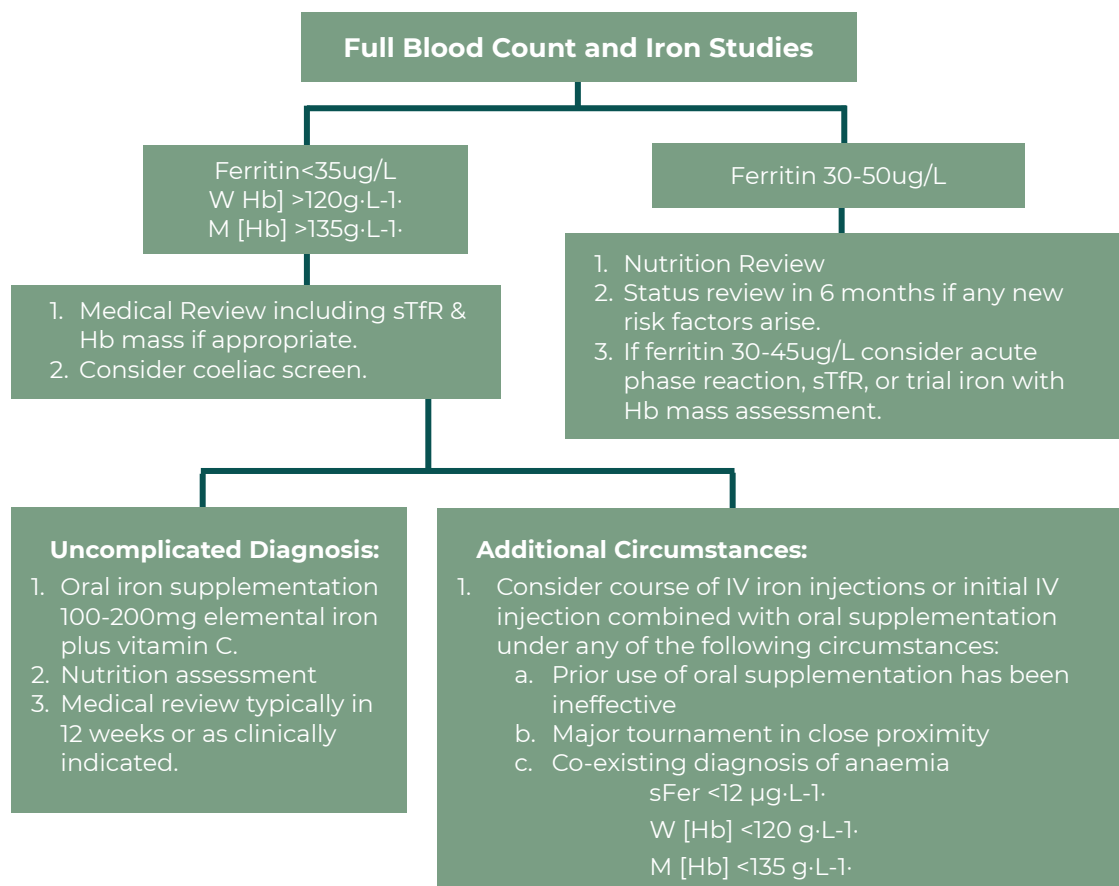
7.2 Intravenous iron therapy (intravenous injection of ferric carboxymaltose*) may be prescribed by the AC MO following complete medical review in the following circumstances:

- Severe iron deficiency anaemia (with associated symptoms);
- When documented long term oral supplementation has been deemed to be ineffective in raising iron stores;
- Where low iron stores are detected in close proximity to major cricket tours and haemoglobin mass is deemed compromised;
- Note: Ferric carboxymaltose allows for controlled delivery of iron with minimal risk of release of large amounts of ionic iron in the serum. This preparation is suitable for out-patient use. The use of Iron Dextran is NOT suitable.

7.3 Administration of parenteral iron therapy must comply with WADA/Sport Integrity Australia restrictions; infusion volume limited to 100ml in 12 hours outside of a hospital setting.

8. MANAGEMENT PLAN

8.1 Players with iron deficiency should be managed by the AC MO with support from an AC Sports Dietitian to ensure long term dietary modification is achieved (see figure below).



REVISIONS

DATE	BY
31 July 2020	CA Deputy CMO, CA Chief Medical Officer, CA Lead Sports Performance Dietitian
22 June 2021	CA Deputy CMO, CA Lead Sports Performance Dietitian t, AC State Sports Dietitians
29 June 2022	CA Deputy CMO, Lauren Stribley (Sport Dietitian specialising in female athlete health)
31 July 2023	CA Deputy CMO, CA Chief Medical Officer, CA Lead Sports Performance Dietitian
7 July 2024	CA Deputy CMO, CA Lead Sports Performance Dietitian, Dr Peter Peeling- Professor, School of Human Sciences, University of Western Australia
3 July 2025	CA Chief Medical Officer, CA Lead Sports Performance Dietitian
30 June 2026	CA Deputy CMO, CA Chief Medical Officer, CA Lead Sports Performance Dietitian