Policy Rationale/ Background

The detail below is based on information provided to the NTIS by Associate Professor Kieran Fallon MD FACSP (Head of the Department of Sports Medicine at the AIS) in a document titled Iron Deficiency in Elite Athletes, written in March 2012.

The incidence of iron deficiency anaemia (IDA) and iron depletion, generally assessed by measurement of serum ferritin concentration has frequently been assessed in elite athletes. Based upon recent studies, in elite male athletes, the incidence of iron-deficiency anaemia ranges from 0 to 3% and low serum ferritin concentration from 3-36%. In female elite athletes the corresponding figures are 0-21% and 16-57%, respectively.

Anaemia is diagnosed in athletes in the same way using exactly the same parameters as in the general population. Common symptoms include fatigue and increased dyspnoea with exertion and, in athletes and the physically active, reduction in physical performance. Anaemia is not a final diagnosis and a cause must always be sought. All cases should be referred for medical consultation. Important causes in the athletic population include blood loss, medications, particularly non-steroidal anti-inflammatory drugs, celiac disease, particularly in young women, recent pregnancy and inadequate diet.

The key issue related to the assessment of iron status in athletes is the relationship of iron depletion to performance. The detrimental effects of iron deficiency anaemia on aerobic capacity and exercise performance have been frequently demonstrated and have been summarised in a recent review (Haas and Brownlie 2001). The main conclusion to be drawn from the many studies done in this area is that, in female athletes, in the absence of anaemia, decrements in performance may be caused by tissue iron deficiency sufficient enough to cause an elevation in sTfR greater than 8.0 mg/L (based on the method of analysis used). This has implications for iron supplementation to avoid such decrements in performance. As iron stores in athletes are generally measured by assessment of serum ferritin, knowledge of the level of this parameter at which sTfR is > 8.0mg/L using the method of analysis of this parameter used in these studies is important.

The normal range for the Ramco Laboratories method for determination of sTfR used in the studies by Brownlie et al (2002, 2004) is 3-8.2 mg/L (Van den Bosch et al 2001). This suggests that the athletes who are not anaemic and who benefit from iron supplementation are those who are at the verge of or are those who have iron deficient erythropoiesis. While the serum ferritin concentration at the upper limit of normal of sTfR has not been specifically determined using the method used by Brownlie, other studies, using other analytical methods, suggest that the upper limit of normality for sTfR lies at a serum ferritin concentration of approximately 22ug/L (Souminen et al 1998, Pitsis et al 2004). This is a key finding in relation to decisions about iron supplementation based on serum ferritin measurements.
Despite much having been published on iron deficiency in athletes, recommendations relating to a cut-off value for iron supplementation in athletes are remarkably hard to find and have generally been expressed in terms of serum ferritin concentration. The exact bases upon which some of these recommendations have been made are unclear. Taking the many studies into this area into account it would seem reasonable to suggest that at least assessment and correction of dietary iron intake, exclusion of medical disorders which might lead to iron loss and, generally, oral iron supplementation should occur in all athletes with serum ferritin concentrations < 30ug/L.

Policy and Procedure Summary

The NTIS policy for the testing and management of iron and ferritin levels is based on recommendations from the AIS. Certain athletes groups within the general population are considered to be at increased risk of developing iron deficiency. These groups include athletes who undertake intensive training programs. It is therefore desirable that such athletes have regular testing of their iron and ferritin levels to ensure that they retain adequate levels.

The following NTIS athletes are considered to be at an increased risk of developing low iron and ferritin levels.

a) All female athletes undertaking 5 or more sessions per week
b) Any athlete who is identified by their diet or medical screening to be at risk of iron deficiency.

Any Level 1-4 athlete flagging excessive fatigue or over-training or who are identified to be at risk off iron deficiency, either in their annual Athlete Medical Screening, or to NTIS coaching staff will be referred to the NTIS Sports Medicine and Physiotherapy Coordinator to organise further follow up.

Based on recommendations from the AIS, any athlete presenting with a serum ferritin concentration of <30ug/L (even in the absence of anaemia) will require further medical consultation, and if nothing obvious is found they will be recommended for nutritional assessment to check the diet and advise on iron intake, etc. Current AIS practice is for all of those athletes who don’t have a medical reason and also those who have low dietary iron intake to go on Ferrogradumet tablets +/- vitamin C 500mg , one a day for three months at which time a repeat serum ferritin is done. In summary they like to keep serum ferritin above 30 but acknowledge that it needs to be remembered that, particularly in some females, lower levels are normal for some athletes and in these cases, after supplementation, ferritin will return to their own “normal” level. Any athlete presenting with anaemia must be investigated on normal medical lines, and they also will receive further nutritional assessment and advice.