

**SCIENTIFIC ADVISORY COMMITTEE ON NUTRITION  
DRAFT REPORT ON IRON AND HEALTH**

**Issue**

1. The Scientific Advisory Committee on Nutrition (SACN) released their draft report on Iron and Health for scientific consultation on 17 June 2009. The scientific consultation period will run until 23 September 2009, and SACN would welcome any comments on the scientific content of the draft report from the Scottish Food Advisory Committee.

**Background to the review**

2. SACN is an advisory committee of independent experts that provides advice to the Food Standards Agency (FSA) and the Department of Health (DH) as well as other Government Agencies and Departments. Its remit includes advising matters concerning nutrient content of individual foods, advice on diet and the nutritional status of people.
3. UK national dietary surveys have consistently shown that a proportion of the population, particularly children aged 1½-3½ years (12-24%), girls aged 11-18 years (44-48%) and women aged 19-49 years (25-40%), have low iron intakes relative to recommended reference intakes, which has raised concerns that they may be at risk of iron deficiency.
4. In their report, Nutritional Aspects of the Development of Cancer (DH, 1998), the Committee on Medical Aspects of Food and Nutrition Policy (COMA) highlighted possible links between red and processed meat and colorectal cancer and recommended that “high consumers should consider a reduction” in red and processed meat consumption. Since red meat is a rich dietary source of iron any general recommendation to reduce meat consumption might compromise dietary sources of iron, and other micronutrients.
5. Progressive iron deficiency leads to anaemia for which there are reported associations with impairments of: physical work capacity; cognitive and psychomotor development; immune function; and reproductive efficiency. Conversely, there is evidence that excess of iron could also have some harmful effects. The consideration of the extent and consequences of inadequate iron nutrition in the UK population therefore needs to be sensitive to the balance between iron deficiency and iron excess.
6. The SACN Working Group on Iron was established in 2001 with the following terms of reference:

*To review the dietary intakes of iron in its various forms and the impact of different dietary patterns on the nutritional and health status of the population and to make proposals.*

The Working Group was also asked to consider both beneficial and adverse effects increasing iron intakes, including the:

- Effect of dietary components on iron absorption and utilisation in the body.
- Interaction of infections and inflammation, with iron metabolism.
- Effect of iron deficiency on health and well-being, for example mental and physical development.
- Potential adverse effects of excess iron, including free radical damage and the risk of cardiovascular disease and cancer.

### **Main conclusions of the draft report**

7. The main conclusions of the draft report are as follows:

- Dietary iron exists in two main forms: haem iron and non-haem iron. Haem iron is found mainly in foods of animal origin; non-haem iron found in animal and plant tissues.
- The body's need for iron is the most important determinant of how much iron is absorbed from the diet; this means that more iron is absorbed in a state of iron deficiency and less is absorbed when iron stores are adequate. Although some dietary components have been shown to increase (meat, vitamin C) or reduce (calcium; phytates, found in whole grain cereals; phenolic compounds, found in tea and coffee) iron absorption, they do not substantially influence iron status; bioavailability of dietary iron is not a significant factor in the development of anaemia or iron deficiency in the UK population.
- Causes of iron deficiency include inadequate intakes of iron, impaired absorption, and increased blood losses due to menstruation or gastrointestinal disease. Progressive iron deficiency leads to anaemia, i.e. a decrease in haemoglobin concentrations and in circulating numbers of precursor red cells, and iron-dependent functions are affected. It has been proposed that anaemia is associated with adverse effects on physical work capacity, and cognitive, motor, and behavioural development in children.
- Studies in humans suggest that iron deficiency anaemia may be associated with reduced work capacity although there is no clear threshold of haemoglobin concentration for this effect; iron deficiency in the absence of anaemia has not been found to affect work capacity.
- Iron deficiency anaemia is probably associated with poor motor development in children in the first 3 years of life, although long-term effects are unknown; it is not clear if iron deficiency or iron deficiency anaemia affects cognitive or language development in children under 3 years. Iron treatment may have beneficial effects on cognitive development in anaemic older children, however, it is not known if these benefits are long-lasting. The available data

do not allow identification of the thresholds of iron status at which cognitive, motor and behavioural development might be affected.

- It has been proposed that high iron intakes may increase the risk of colorectal cancer, cardiovascular disease (CVD), infection, neurodegenerative disorders, and inflammatory conditions.
- Limited evidence suggest that increased dietary intakes of total or haem iron are associated with increased colorectal cancer (CRC) risk, however confounding by other dietary and lifestyle factors is likely. Overall, there are insufficient data to draw conclusions on the association between total or haem iron intake, or iron stores and CRC risk. Meat, particularly red meat, is the main source of haem iron. The available evidence suggests that red and processed meat intake is probably associated with increased CRC risk. However, as the evidence is based on observational studies, the effects of confounding by other factors associated with increased CRC risk cannot be excluded. It is not possible to identify the amounts of red or processed meat which may be associated with an increased CRC risk because of a number of limitations in the data.
- The available evidence on total iron intake or status and CVD do not suggest an association. Limited evidence suggests that high intakes of haem iron probably increase CVD risk. It is possible that the increased risk could be due to other components of meat (the main source of haem iron) associated with CVD risk, such as saturated fats.
- The evidence suggests that iron supplementation does not increase the risk of non-diarrhoeal or respiratory tract infections in children but may increase diarrhoea risk. There is currently insufficient evidence to draw conclusions on the relationship between iron supplementation and HIV or tuberculosis. There is no evidence to suggest that improving iron status in the UK would have any impact on infectious disease incidence or morbidity.

### **Recommendations of the draft report**

8. SACN's draft recommendations are as follows:

- It is important to ensure that the UK population has a safe and adequate supply of iron. Most population groups in the UK are iron replete. Groups at risk of iron deficiency<sup>1</sup> include toddlers, girls and women of reproductive age, and adults aged over 65 years. Health professionals need to be vigilant of poor iron status in these groups and ensure that they are provided with appropriate medical advice, including dietary advice on how to increase their iron intakes and to consider use of iron supplements if required.
- A public health approach to increasing iron intake, i.e. a healthy balanced diet, including a variety of foods containing iron, is important in helping people achieve adequate iron status. Such an approach is more important than focusing on particular inhibitors or enhancers of the bioavailability of iron from diets or the use of iron fortified foods.

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<sup>1</sup> Defined as serum ferritin concentrations below the following thresholds (WHO): children 1½-4½y, 10 & 12 µg/L; children 4-6y, 12 µg/L; children >7y and adults, 15 µg/L.

- Lower consumption of red and processed meat would probably reduce the risk of colorectal cancer. Although the evidence is not conclusive, as a precaution, it may be advisable for intakes of red and processed meat not to increase above the current average (70 g/day) and for high consumers of red and processed meat (100 g/day or more) to reduce their intakes.
- As previously recommended by the National Institute for Health and Clinical Excellence (NICE, 2008), iron supplementation should not be offered routinely to all pregnant women but should be considered for women identified with haemoglobin concentrations below 110 g/L in the first trimester and 105 g/L at 28 weeks.

### **Scottish intakes of red and processed meat**

9. FSA Scotland have recently commissioned a study to investigate the intake of red and processed meat in Scotland. Preliminary findings estimate the current average intake of red and processed meat in Scotland to be 63 g/day compared to 70 g/day in the rest of the UK. This difference is small and is likely due to differences in the methodology used rather than reflecting any difference in absolute intakes. Once the study is finalised the results will be published on the FSA Scotland website.

### **Next steps**

10. The 14-week scientific consultation period will end on 23 September 2009. SACN will then revise and publish the final report on iron and health. It is anticipated that the FSA Board will discuss the final report's recommendations at their meeting in May 2010 and formally advise all UK health ministers.