

4th MEETING OF THE WORKING GROUP ON IRON

13 May 2003, FSA, Aviation House, Conference Room 145

Final Minutes

Chairman Professor Peter Aggett

Vice Chairman Dr Ann Prentice

Members Professor Sue Fairweather-Tait
Professor Kim Fleischer Michaelsen
Dr Tim Key
Professor Joe Lunec
Professor Martin Pippard
Professor Mark Worwood

Secretariat Dr Alison Tedstone (FSA)
Dr Sheela Reddy (DH)
Ms Rachel Elsom (FSA)

Chair's Introduction

1. The Chair welcomed Members to the fourth meeting of SACN's Working Group on Iron. Apologies for absence were received from Professor Sally Grantham-McGregor, Dr Bruno de Benoist and Professor Philip Calder.

AGENDA ITEM 1

Minutes of 3rd Meeting (17 January 2003)

2. The Chair invited Members to comment on the minutes. Members requested the following amendments.

3. Paragraph 17, second sentence to read:

"Members agreed that for the purposes of the Working Group Report it would be important to comment on the various links between haemochromatosis and HFE gene mutations in the context of public health and risk."

4. Paragraph 22, second sentence to read:

"Members noted that iron supplementation may have detrimental effects on copper and zinc status and possibly infection, but also commented that this population group was a special group outside the Working Group's Terms of Reference."

5. Members agreed these revisions to the minutes.

Matters Arising

6. There were no matters arising.

AGENDA ITEM 2

Review of draft

7. The Chair informed Members that the Drafting Group had focussed on re-arranging and orientating the material into the various sections. Members noted that there is replication of material throughout the document and the level of detail is often too great for the purposes of this Report. It was agreed to further précis the information to help clarify the key principles and public health messages. This will help: emphasise inter-individual variation, identify 'at risk' population groups, define the potential adaptation to low iron status, and provide an insight into future research needs.

Action: Members

8. Members agreed to make more use of tables and figures and that these will be embedded in the text where possible.

9. Members discussed the new A5 format of SACN reports and in particular how tables should be dealt with given the reduced size. The Secretariat agreed to explore the various options.

Action: Secretariat

10. The Working Group then reviewed the preliminary draft for nuances, detail, consistency, evidence-base and significant omissions.

Section 1: Introduction and Terms of Reference

11. Members noted the report from COMA's Working Group on Diet and Cancer entitled the 'Nutritional Aspects of the Development of Cancer' (1998), and in particular the Working Group's recommendation to review the possible associated adverse implications of a reduction in meat consumption on other aspects of health, particularly iron status. Members discussed this recommendation. They stressed that concerns over low iron stores in vulnerable groups were important and that these concerns should be described in the introduction.

12. Members agreed that the most current and relevant National Diet and Nutrition Survey (NDNS) data should be used to both identify and characterise at risk groups.

13. Members discussed the difficulty of defining iron deficiency. It was agreed that a general statement on iron deficiency in the presence and absence of anaemia and its possible functional consequences was required at the beginning of the document. Members agreed that 'storage iron depletion' or 'low iron stores' more accurately reflected what was measured and that these, and similar terms should be used in place of 'iron deficiency'.

Section 2: Biochemistry, metabolism and dietary sources and intakes

14. Members agreed to organise this section into chemistry, biochemistry, and physiology of iron. A diagram on iron absorption tabled at the meeting should be central to this section and will allow much of the text to be préciséd.

15. Members noted the lack of information on the assessment of the risks of iron deficiency and its prevalence in the population. A separate section (to follow the 'Biochemistry, metabolism and dietary sources & intakes' section) on the assessment of 'iron status' will be added covering the various tools employed to measure iron status and problems associated with the interpretation of results (e.g. circulating ferritin concentrations are confounded by chronic illness). The World Health Organisation (WHO) multiple methods scheme for the identification of iron deficiency anaemia will be highlighted. A discussion on adaptation to iron deprivation will be included. The anaemia of chronic disorders will also be covered.

16. The Secretariat agreed to conduct a literature search on the different methodologies employed to assess iron status.

Action: Secretariat

17. Members agreed that the Drafting Group would be responsible for structuring of the Report.

18. Members agreed to have a sub-section on the housekeeping proteins involved in iron metabolism. Details regarding the regulation of these proteins will be placed in general information boxes within the text together with references to relevant scientific reviews. This information must be accessible and should appear early in the Report as it underpins many of the later discussions. Members agreed that details on the structure of the housekeeping proteins should be kept brief.

19. Members discussed iron homeostasis and agreed that more coverage is required on this area. It was decided that iron kinetics should be described first with the aid of figures and a simple narrative, and should be followed by a discussion on mechanisms and regulation. Detailed information should be provided in boxes and should also include identification of gaps in current knowledge and an indication of future research priorities. Finch's model of iron compartments (Finch CA et al. *Ferrokines in man. Medicine* 1970; 49(1): 17-53) had been used as an example. Members agreed to investigate whether there is another similar figure reflecting current understanding of the processes to underpin this sub-section.

Action: Members

20. Members noted that the HFE nomenclature is confusing and stressed that terms must be clarified and used with consistency throughout the Report.

21. Members discussed the sub-section on 'Dietary Sources'. They noted the importance of including the latest data from the NDNS Adults (2000/01) and stated that data on current intakes of micronutrients from dietary sources versus supplements will be of particular interest. Data from the National Survey of Health and Development (1946 Birth Cohort) should also be included to show changes in children's iron intakes over time.

22. Members agreed to add a table showing the content of haem iron in different foods. They noted that it would be necessary to comment on the validity of food composition data.

Action: Members

23. Members stated that information on the iron fortification of infant formula should be moved to this section.

Action: Members

24. Members discussed the sub-section on 'Bioavailability'. They agreed to highlight and illustrate the uncertainties arising from the variety of methods and study protocols used to determine 'bioavailability' e.g. single meal versus whole diet studies and single event studies which do not investigate adaptive responses to dietary interventions. They noted that evaluation of this evidence may have implications for dietary advice.

Action: Members

25. Members agreed to annex the 'Measurements/methodology' sub-section.

Action: Secretariat

26. Members noted that tables detailing the enhancers and inhibitors of iron absorption would be useful along with the reference to the related evidence.

Action: Members and Secretariat

27. Members discussed whether a review of the literature on meat versus vegetarian diets in relation to iron content and the iron status of consumers should be conducted to assess the state of the evidence-base. The Secretariat agreed to conduct a literature search for papers on iron and vegetarian diets.

Action: Secretariat

Section 3: Perturbations and inborn errors of metabolism

28. Members discussed the section on 'Inborn Errors of Metabolism'. They agreed to supplement the table with text focussing on the functional importance of each of the proteins and their relevance to human populations.

Action: Members

Section 4: Iron deficiency

29. Members discussed the section on 'Iron Deficiency' and agreed to include a table outlining the transition phases from iron repletion to iron deficiency anaemia.

Action: Members

30. Members stated that the data on threshold levels for the various parameters of iron status is limited and no threshold can be identified to be predictive of functional effects.

31. Members agreed to cover pregnancy, lactation and infancy in a separate section.

32. Members noted that sub-sections on iron and the brain and iron and work performance are still to be added.

Action: Members

33. The Secretariat agreed to circulate a paper by Casanueva and Viteri (2003) on iron and oxidative stress during pregnancy, and to conduct a literature search on iron deficiency, and how it had been characterised (see section 13) [DN: Check with PA] in UK infants.

Action: Secretariat

Section 5: Iron excess

34. Members discussed this section and agreed that the title should be changed to 'Adverse effects of iron'. They noted that it would be important to determine the consequences of iron excess. Members agreed that primary and secondary conditions associated with iron excess should be tabulated.

Action: Members and Secretariat

35. Members agreed that although iron biochemistry will be dealt with at the beginning of the Report, the role of iron as a pro-oxidant will be dealt with in this section.

36. Members noted the sub-section on iron and neurodegenerative disease. They agreed that here and throughout the report, original references should be cited as opposed to literature reviews of the evidence.

37. Members agreed to integrate into this section information on the influence of HFE mutations on chronic disease.

Action: Members

38. Members noted that there are three distinct categories of iron excess which should be outlined: exposure to too much iron by ingestion and its potential for adverse effects on the intestines; HFE mutations; and iron overload.

39. Members agreed to split the sub-section on iron and infection/immunity into separate sub-sections on the effects of iron deficiency on infection/immunity and the effects of iron excess on infection/immunity.

Action: Members

40. Members agreed to add information on the effects of iron supplementation on growth in children.

Action: Members

Section 6: Public health issues and advice

41. Members discussed this section and agreed that, although it was not on the Working Group's remit or competence to consider the issue in detail, the report should alert people and Government to perceptions of the long and short term socio-economic costs of iron deficiency in developing countries and the potential relevance of such considerations to at risk communities in the UK. In addition, the costs associated with excess iron should be considered.

42. Members agreed that: Martin Pippard would co-ordinate the section on "Biochemistry, metabolism and dietary sources and intakes"; Mark Worwood would co-ordinate the section on "Inborn errors of metabolism"; Peter Aggett would co-ordinate the section on "Iron deficiency"; and Joe Lunec would co-ordinate the section on "Iron Excess". These members would collaborate to ensure the overall consistency and comprehensiveness of these sections.

Timetable

43. Members were asked to send updated drafts to the Secretariat by the beginning of August. The Drafting Group will meet at the beginning of September to discuss the amended Report. The aim will be to get a final draft of the Working Group's report on Iron to the main SACN committee by February 2004, before sending it for public consultation.