



13th MEETING

Carbohydrates Working Group

21st October 2011, Room LG17, Wellington House

135-155 Waterloo Road, London, SE1 8UG

FINAL MINUTES

Chair:	Professor Ian Macdonald
SACN Members	Dr David Mela Professor Ian Young Professor Julie Lovegrove Professor Angus Walls Professor Ian Johnson Mrs Christine Gratus Professor Tim Key Ms Alison Eastwood
Other attendees:	Dr Victoria Burley (University of Leeds) (item 3) Dr Charlotte Evans (University of Leeds) (item 3) Ms Diane Threapleton (University of Leeds) (item 3) Dr Peter Sanderson (items 1 and 2)
Observer:	Dr Gillian Purdon (FSA Scotland) Dr Alison Tedstone (Department of Health)
Secretariat:	Dr Elaine Stone Mrs Vicki Pyne Ms Verity Kirkpatrick

Chair's introduction and welcome

1. The Chair welcomed members to the 13th meeting of the SACN Carbohydrates Working Group.
2. Apologies were received from Dr Mark Beattie and Professor Annie Anderson.
3. The Chair asked members for any changes in their declarations of interest; Professor Lovegrove informed members she recently received research funding from the Sugar Bureau.

Agenda item 1 – Minutes of the 12th meeting (SACN/Carbohydrates/11/min/03)

4. Members were invited to comment on the minutes of the 12th meeting of the Carbohydrates Working Group.
5. Paragraph 29, second sentence amend to “Members agreed that the disease *and/or illness* status of the subjects..”
6. Subject to the above changes, members agreed that the minutes are an accurate record of the meeting.

Matters arising (SACN/Carbohydrates/11/16)

7. Dr Elaine Stone introduced the matters arising.

Matters Arising – Carbohydrates and cardiometabolic health review

8. Professor Young informed members that he sent the Leeds team a power calculation for CRP.

Matters Arising – Carbohydrates and colorectal / oral health review

9. The Secretariat is currently completing the work to check 10% of excluded studies for the colorectal and oral health reviews.

Matters Arising – Carbohydrates and oral health review

10. A paper on non-randomised trials has been prepared and will be discussed under agenda item 2.
11. The data extraction process will be checked by the Secretariat over the next few months.

Matters Arising – Carbohydrates and cardiometabolic health

12. Studies included in the previous COMA reports have been identified and the cardiometabolic health review inclusion/exclusion criteria applied. The outcome of this exercise was sent to the Leeds team.

Agenda item 2 – Carbohydrates and oral health review

13. Further consideration of the health status of subjects resulted in one out of the four studies being included in the review.
14. Members were informed that three dental caries trials identified in the COMA report have also been included in the oral health review. Two studies do not report randomisation and will be included in the annex (Gustafsson et al.,1954 and Scheinin *et al.*,1976), the other will be included in the main review (Scheinin et al., 1975). It was requested that information from these studies is tabulated. The remaining studies considered by COMA were cross sectional and case control studies and, therefore, not included in the oral health review.

Action: Peter Sanderson

15. The oral health review now provides results of the literature search for all exposures, including those where no studies have been identified.
16. Narrative on cross-sectional data of root caries has been provided in the introduction and paragraph 21.

Agenda item 3 – Carbohydrates and colorectal health

17. The rationale for including certain health outcomes within the colorectal health review was presented at the SACN meeting on 19th October.
18. Andrew James explained that dose-response meta-analysis is the preferred approach because it allows an effect to be quantified across a range of intakes. The highest versus the lowest approach only captures information between two points, thus making the data less interpretable. Members were informed that the dose-response method assumes a linear relationship and a test for linearity is conducted before analysing the data further.

Agenda item 5 – Carbohydrates and cardiometabolic health- blood pressure section

19. Drafting of the introduction to the blood pressure section will be discussed under agenda item 3.

Agenda item 5 – Carbohydrates and cardiometabolic health- energy intake and satiety

20. The exclusion of Mensink and Katan 1987 and re-ordering of the energy intake and appetite section will be discussed with the Leeds team.

Agenda item 6- AOB

21. The issue of significant findings was discussed at the SACN meeting on 19th October, which included input from statisticians within the Department of Health.

Agenda item 2- Carbohydrates and oral health: non-randomised trial of digestible carbohydrates and dental caries (SACN Carbohydrates/11/17).

22. A member suggested that diagrams to accompany the definition of dental indices would be helpful and asked the Working Group if it would be appropriate for a SACN report. Members agreed that diagrams would be useful to include.

Action: Angus Walls

23. The Chair welcomed Dr Peter Sanderson (PS) and invited him to introduce the paper on “Non-randomised trials investigating digestible carbohydrate and dental caries”.

24. Five non-randomised studies were identified: Gustafsson *et al.*, 1954, Sheinin *et al.*, 1976, King *et al.*, 1955, Dunning and Hodge 1971 and Frostell *et al.*, 1974. PS highlighted that the trials did not comment on oral hygiene.

25. Members noted that due to the nature of the intervention used in Gustafsson *et al.*, 1954, the findings cannot be generalised with confidence to other populations. However, the study provides useful information on frequency of sugar consumption and the risk of dental caries.

26. A member highlighted that the findings from these trials suggest that sugar consumed between meals appears to be more cariogenic than sugar consumed as part of meals. It was suggested this observation is captured in the commentary.

27. In table 3, it is unclear if the findings are statistically significant. It was agreed that a footnote should be inserted to indicate where results are significant.

Action: Peter Sanderson

28. It was noted that the control group in Gustafsson *et al* 1954 experienced a marked reduction in caries incidence, compared to the intervention group, particularly when no additional sucrose was provided in the diet.
29. The trials should be described as studies that do not report randomisation rather than “non-randomised” trials. In addition, information on how the studies were conducted should be included instead of providing a risk of bias table.

Action: Peter Sanderson

30. It was agreed that studies in which randomisation cannot be confirmed should be excluded from the oral health systematic review, however they should be included as an annex to inform discussions for the main SACN report.

Action: Peter Sanderson

Agenda item 2- Carbohydrates and oral health: draft carbohydrates and oral health review (SACN/Carbohydrates/11/17)

31. The Chair informed members that the new sections on periodontal disease and oral cancer will be discussed first, followed by discussions on the amended dental caries and dental erosion sections.

Periodontal disease

32. A member highlighted that the Adults Dental Health Survey's in 1978 and 2009 were not UK wide, because they did not include Scotland. The text should be amended to reflect this.
33. It was suggested that a paragraph is added to the introduction to highlight that periodontal disease is a risk factor for cardiovascular disease and diabetes. Professor Walls agreed to draft a paragraph.

Action: Angus Walls

34. Paragraph 165- the study by Merchant et al., 2006 did not adjust for tooth brushing, therefore some narrative should be included in order to be consistent.

Action: Peter Sanderson

35. The Chair questioned whether a duration of four days would be long enough to detect differences in outcomes. Members were informed that the duration is too short for tooth mobility. A change in gingivitis might be observed, but "artificial gingivitis studies" usually ask people to refrain from oral hygiene for 14-21 days to investigate the development of gingival inflammation. It was agreed that based on the review's inclusion criteria, Cheraskin et al., (1965a&b) should be excluded and the reason for this should be clearly stated.
36. Members discussed English et al., (2004) which investigated chewable honey leathers and the occurrence of gingival bleeding. It was highlighted that the mechanical action of chewing the leathers could reduce plaque build up. Honey also has antibacterial/anti-inflammatory properties, which could affect gingival health. It was agreed to exclude this study because it cannot be determined if the carbohydrate component is exerting the observed effect.
37. Members were informed that studies using gingival state cannot be directly compared to studies measuring gingival bleeding score.
38. A member highlighted that paragraph 178 could be interpreted as evidence for a protective effect of polyols, rather than a negative effect of sucrose. This requires further consideration.
39. Paragraph 179- it was questioned whether the significant differences reported represent a change in the treatment group versus the control group, using baseline values as covariates, or if it means that one group was significantly higher than the other at the end of the study. It was agreed that this information would be checked and captured in the paragraph.

Action: Peter Sanderson

40. A member asked if subjects brushed their teeth during the study. PS informed members that tooth brushing habits were not reported in Harjola and Liesmaa 1978 or Cheraskin 1965a&b. The subjects in Sidi and Ashley 1984 wore teeth guards on their lower anterior teeth during oral hygiene procedures.
41. It was noted that, with the exception of Sidi and Ashley, no wash out period was reported for these studies. A member questioned whether the subject's diet before the intervention could affect the outcome measures during the trial. The Working Group was informed that gingivitis can develop within three weeks in the absence of tooth brushing. In gingivitis trials, professional oral hygiene is usually performed on all subjects before the study commences. PS confirmed that this was the case in Sidi and Ashley 1984.

Oral cancer

42. It was highlighted that Katsun et al., 2002 only reported results for all upper aerodigestive cancers (which include all head and neck cancers and oesophageal cancer), rather than oral cancer. In addition, there were only 53 cases of upper aerodigestive tract cancers, therefore the study may not be sufficiently powered to detect any differences. For these reasons, members agreed to exclude this study.
43. A member enquired whether soft carbonated drinks in Ren et al., 2010 include diet drinks. PS informed members that this information was not reported.
44. Paragraph 197, 7th sentence- amend to “no linear relationship” rather than “no dose response association”.
45. It was noted that smoking and alcohol are very strong risk factors for oral cancer and that residual confounding is a major issue in studies investigating this outcome.
46. Paragraph 188- PS to check the number of excluded case control studies. Members were informed that data from case control studies have been included in this initial draft because there is a lack of prospective cohort studies available.

47. The Chair noted that it is useful to look at this data but because of the potential for residual confounding and that, the disease may affect dietary habits, case control studies should be excluded from the systematic review. It was agreed that the rationale for excluding case-control studies should be provided in the text.

Action: Peter Sanderson

48. The issue of alcohol, and how it fits with this review, was raised. The Chair explained that the carbohydrate content of alcoholic drinks and the type of drink might not be reported, which would limit the conclusions that could be drawn. It was agreed that a paragraph should be included to explain the rationale of why alcoholic beverages are not being included in the review.

Action: Peter Sanderson

Dental caries

49. It was suggested that the information on root caries in paragraph 21 is made prominent in the report to ensure that the information is not lost. It is important to highlight that there are no trials investigating root caries.

Action: Peter Sanderson

50. It was requested that the percentage of studies reporting their funding source is included.

51. Paragraph 51, last sentence- information appears to be missing.

52. Paragraph 57- penultimate sentence contains the incorrect reference.

Action: Peter Sanderson

53. Members discussed whether the evidence suggests xylitol had specific benefits over other polyols, when compared to sucrose, and whether it is acting as neutral control. It was noted that the findings may demonstrate a beneficial effect of xylitol, rather than an adverse effect of sucrose.

54. A member clarified that consumption of xylitol at physiological levels would be unlikely to lead to inhibition of plaque micro-organisms. A sentence to capture this point needs to be included.

Action: Peter Sanderson

55. The comment on 100% fruit juice in the summary should be removed from paragraph 116 because it relates to only one study, which is insufficient to draw a conclusion. This paragraph should be rewritten and expanded with input from the Working Group.

56. It was noted that the evidence in table 8 does not appear to be consistent with the concluding paragraphs. A more detailed conclusion, which accurately reflects the evidence in table 8 needs to be written with input from the Working Group.

Action: Peter Sanderson

57. Members questioned what is meant by “generally” in paragraph 114. It was suggested that different and consistent descriptors are used, so it is clear how the conclusions were reached.

58. A quality assessment of the studies needs to be included in the conclusions. Details on data analysis should be included and it should clearly state if studies have not provided key pieces of information on the analysis or design.

59. It was suggested to group the studies together and comment on the number of studies and their trends. The conclusions should be expanded to provide details of the robustness and quality of the studies.

60. It was requested that PS draft concluding paragraphs for all sections of the review in line with the discussion above and that these are circulated to members for comment in November.

Action: Peter Sanderson

61. It was suggested that commentary on frequency versus quantity of consumption needs to be captured in the text.

62. A member highlighted that number of times consumed per day is the most important measure of frequency and measures across longer time intervals are a proxy for quantity. Therefore, it is important to distinguish what is meant by frequency.

63. It was agreed that studies that do not report on frequency of intake per day need to be captured separately.

Action: Peter Sanderson

Dental Erosion

64. It was noted that the acid component of soft drinks could be implicated in erosion rather than the carbohydrate intake.

65. The data are important for dental health policy because it may impact on recommendations regarding carbonated beverages, independent of carbohydrate content. It was agreed that the dental erosion section should be moved to an annex and the data will be used to inform the conclusions in the main SACN report.

Action: Peter Sanderson

66. Paragraph 140 should be amended to “hardness of toothbrush bristles” rather than “tooth brush bristle stiffness” and the end of the sentence should read “significantly lower”.

67. It was agreed that the oral health review will be revised by mid November and circulated to members, the Chair of SACN and Chair of SMCN for comment in early December. The review will be presented at the SACN main meeting in February.

Action: Peter Sanderson

68. Members were informed that the systematic reviews will be published on the SACN website as annexes to the main report. It was enquired whether the reviews will be citable from the website and have their own electronic DOI numbers. It was agreed that this will be checked with the publishers.

Action: Secretariat

Agenda item 3- Carbohydrates and cardiometabolic health- chapter 2 markers of cardiovascular disease- The hyperlipidaemias and blood lipids

(SACN/Carbohydrates/11/19)

69. The Chair welcomed Dr Victoria Burley (VB), Dr Charlotte Evans and Ms Diane Threapleton to the meeting.

70. VB introduced the draft section on hyperlipidaemias and blood lipids.

71. A member commented that there was a lot of repetition presenting the section via type of lipid. It was suggested to divide the section into the different carbohydrate exposures and group the lipids under each exposure. Members agreed this approach.

Action: Victoria Burley

72. It was highlighted that the chapters may be read in isolation and therefore information may require repeating. A solution would be to provide cross-references in order to alert the reader to further information. The Leeds team will consider whether this is possible.

73. A member noted that the total:HDL cholesterol ratio has not been included as an endpoint, but this parameter is important for predicting cardiovascular disease risk. VB agreed to check the data. In addition, it was suggested that the introduction mentions the importance of the total:HDL cholesterol ratio, which is used to calculate cardiovascular risk. Professor Ian Young offered to liaise with Leeds Team on the background section to this chapter and to check the information on page 391.

Action: Victoria Burley/Ian Young

74. It was questioned whether the paragraph on interpreting observational data needs to be provided at the end of each summary. The issue of people reading parts of the review in isolation was raised. It was suggested to include the sentence “Please interpret observational data with caution” as a footnote to the tables, but to have the full explanation in the introduction.

75. Page 11, second paragraph- provide more detail on the HDL cholesterol ratio and refer to triacylglycerol rather than triglyceride throughout the report.

76. Page 70- the title should be changed to “Comparison of *higher* carbohydrate...” in order to reflect the titles of the forest plots.

Action: Victoria Burley

77. Members enquired how the Leeds Team defined a high carbohydrate diet. VB informed them that there should be a 5% difference in carbohydrate. It was agreed that details of the criteria that were used to define different diets would be checked.

78. Members requested that the results tables are rearranged so that the studies appear in the same order as in the forest plots.

Action: Victoria Burley

79. Members highlighted that it is important to know the range of exposures and the percentage weight change in order to interpret the results of the forest plots. VB

agreed to run queries on the Access database and provide a separate table for the blood lipid section.

80. It was noted that the forest plots do not have legends. VB informed members that these will be added during revision.

Action: Victoria Burley

81. Page 71, the labels on the x-axis need to be aligned.

82. Members discussed what would be considered as a meaningful change in cholesterol levels. It was noted that on a population level this would represent 0.1 mmol/L of total cholesterol.

83. It was highlighted that the degree of change in cholesterol concentrations observed in dietary manipulation trials is dependent on baseline levels. In addition, the studies are not solely exchanging dietary carbohydrate and it is important to bear this in mind during interpretation.

84. Page 152- the pooled estimate and I^2 values differ between the text and forest plot. This needs to be checked.

85. It was highlighted that if both the HDL and LDL cholesterol concentration decreased proportionally, it could be argued that there is no overall effect. Therefore presenting total cholesterol:HDL cholesterol ratio is very important. It was agreed that studies would be checked to ascertain if this parameter was also measured.

Action: Victoria Burley

86. Members made the following comments:

- Page 228- state which arms of the trial are being compared in the forest plots.
- Pages 305 and 308- the conclusion “there is no strong evidence” is not correct because there is some evidence but the heterogeneity between studies is too high to draw any firm conclusions. The text should be changed to reflect this.
- Sources of heterogeneity should be investigated where possible.

- Page 305- specify which arms of the trial are being compared.
- Page 334- the term non-esterified fatty acids should be used instead of free fatty acids. Last sentence amend to “there was no evidence to suggest that...”
- Page 395- the units cited by Pelkman et al., 2004 appear to be incorrect. It was agreed that the authors should be contacted to obtain clarification.
- Page 395- check apo-lipoprotein A because it is not a recognised marker. Professor Young will advise VB on this.

Action: Ian Young

- Page 106- remove “strong” from the last sentence.
- Page 350- remove the word gums from x-axis of the forest plot.
- The issue of viscosity may explain why certain fibre isolates appear to be having an effect.
- The forest plots have been labelled as GI (e.g. p138), but the studies could also be investigating GL. Need to check GI/GL studies to ensure they are consistent. Convert findings to one unit so studies can be compared.
- In the source of funding source column specify who funded the research rather than whether it was industry or governmental.
- Table 2.55- outcome detail of Davidson et al., 1998 should read “fasting serum”.
- Page 126- first sentence should state that heterogeneity was more than 75%. The last sentence should be revised to reflect that there is too much heterogeneity to draw any conclusions.
- P134- Need to revisit the wholegrain section at the next meeting once the missing studies have been added to the metaanalysis.

Action: Victoria Burley

Agenda item 3- Carbohydrates and cardiometabolic health- chapter 2 markers of cardiovascular disease- Incident hypertension and blood pressure (SACN/Carbohydrates/11/20)

87. Dr Burley summarised the changes to the incident hypertension and blood pressure section.

88. It was highlighted that there are four papers by de Luis at al., which appear to be

the same study. The author has been contacted to clarify whether this is the case, but no response has been received.

89. The Chair agreed to look at the papers and if it is unclear, it was suggested the journal editors are contacted regarding multiple publication.

**Action: Chair and Ian Young
/Secretariat**

90. Members requested that the conclusions are phrased so they are clear and consistent with discussions of the previous section.

91. The GI/GL section needs to be checked ensure it is consistent with other sections.

Action: Victoria Burley

Agenda item 3- Carbohydrates and cardiometabolic health- chapter 2 markers of cardiovascular disease- vascular function (SACN/Carbohydrates/11/21)

92. Dr Burley summarised the changes made to the vascular function section. The number of outcomes have been reduced to reflect discussions at the previous Working Group meeting.

93. A member questioned the sentence in paragraph 2 (page 2) that the amount of fat consumed is not related to vascular function, stating that there are acute effects of fat. It was agreed that this sentence should be removed.

94. Under the first paragraph on flow mediated dilatation, it was suggested that the first sentence is edited to “be most commonly used”.

95. A member highlighted that PWV is not endorsed for use in clinical practice and it was suggested that the wording in paragraph 3 (page3) could be altered to “is generally only used for research purposes”.

96. A member suggested editing the heading of paragraph 4 (page 3) from “augmentation index” to “pulse wave analysis” but keeping the text in the paragraph unchanged.

Action: Victoria Burley

Agenda item 3- Carbohydrates and cardiometabolic health- chapter 1: cardiovascular disease and dietary carbohydrate (SACN/Carbohydrates/11/22)

97. Dr Burley highlighted the key changes to the cardiovascular disease chapter.

98. Members made the following comments:

- Page 6, third paragraph, penultimate sentence- remove the word “suddenly”.
- Page 6- remove paragraph on angina.
- Page 30- it was noted that the NDNS data is based on one year (Bates et al., 2009). VB confirmed that all the standard deviations and means were based on this data.

99. It was noted that in the dose response meta-analyses for dietary fibre it is unclear how much intake has changed from baseline. This information is important because the data will only be valid across a certain range of intakes and this is dependent on what dose has been used in the studies. It was agreed that the ranges of intakes will be obtained from the studies used in the dose-response meta-analyses.

Action: Victoria Burley

100. The summary estimate labelled as “overall studies” in the forest plots should be changed to “adjusted for age”. It was highlighted that the summary estimates adjusted for age are the same as those adjusted for age and smoking, except in one meta-analysis (p 133 non-soy legumes).

101. It was noted that a consistent approach needs to be used for all the forest plots and the units should be added to the X-axis of each funnel plot (eg on p 54). An

explanation of what is being demonstrated in the funnel plots also needs to be included.

102. VB highlighted to members that the studies included under total cereals have different definitions and they do not always state what items they are including within this category.
103. It was noted that a 0.5 servings/day increment used in the meta-analyses for breakfast cereals has been used. However, the cohort studies were all conducted in the US, therefore their definition of a serving will be different to the UK definition. This issue needs to be captured in the text.

Action: Victoria Burley

104. Members noted that the UK intake of wholegrain was obtained from analysis of the NDNS. However, the studies included in the meta-analysis were all conducted in the US and use different definitions of wholegrain compared to the UK. This needs to be taken into account when interpreting the data.
105. Figure 1.22 the title should be amended to stroke rather than CHD.

Agenda item 3- Carbohydrates and cardiometabolic health- markers of inflammation (SACN/Carbohydrates/11/22)

Due to the time constraints of the meeting, members were asked to email their comments on this section to the Secretariat.

Action: Members

Agenda item 4- AOB

106. The date of the next meeting is 27th January 2011.
107. The Chair thanked members for their attendance and closed the meeting.