Responses to Consultation Comments:

Responses by the Scientific Advisory Committee on Nutrition (SACN)
to comments received during public consultation on
the draft Carbohydrates and Health report

The final report can be accessed below:

https://www.gov.uk/government/publications/sacn-carbohydrates-and-health-report

Contents

Procedure

The secretariat alerted interested parties that the draft *Carbohydrates and Health* report had been placed on the SACN website on 26th June 2014. Comments on the science of the report were requested to be submitted by 1st September 2014.

SACN wishes to note that each of the consultation comments received was very carefully considered by the committee. Where consultation comments are similar, the committee's responses are repeated purely in order to ensure consistency.

Respondents

In total 58 responses were received.

Responses were received from the following organisations and individuals:

1. Action on Sugar
2. Dr Dominik D Alexander, EpidStat Institute, Coca Cola
3. Alliance for Potato Research and Education (APRE)
4. Association for the Study of Obesity (ASO)
5. Professor Janettte C Brand-Miller, University of Sydney
6. British Association for the Study of Community Dentistry
7. British Dental Association
8. British Dietetic Association (BDA)
9. British Nutrition Foundation (BNF)
10. British Retail Consortium (BRC)
11. British Soft Drinks Association
12. Dr Annette Buyken, University of Bonn
13. Calorie Control Council
14. Cardiff and Vale University Health Board
15. David Chong Kwan
16. Clasado Limited
17. Dairy UK
18. Dietitians in Obesity Management UK
19. Director of Public Health for Knowsley Metropolitan Borough Council
20. Dr Sandra Drummond, Queen Margaret University
21. European Association of Polyol Producers (EPA)
22. European Natural Soyfoods Manufacturers Association (ENSA)
23. Fibre Consortium
24. Food Safety Authority of Ireland (FSAI)

25. Food and Drink Federation (FDF)
26. Dr Dennis T Gordon
27. Grocery Manufacturers Association (GMA)
28. Heart of Mersey (Food Active)
29. Hywel Dda University Health Board (HWB)
30. J. Rettenmaier & Soehne (JRS)
31. Professor Philip James, London School of Hygiene & Tropical Medicine, and Professor Aubrey Sheiham, University College London
32. International Carbohydrate Quality Consortium
33. Geoffrey Livesey, Nutrition Logic
34. Dr Angela Madden & Dr Katerina Vafeiadou, University of Hertfordshire
35. Medical Research Council- Human Nutrition Research (MRC- HNR)
36. National Institute of Clinical Excellence (NICE)
37. Nestle
38. Nutrition Society
39. Ocean Spray Cranberries Inc.
40. Potato Council
41. Potato Processors Association
42. Public Health England- Dental Public Health
43. Dr Magda Robinson, Obesity Management Consultant
44. Professor Andrew Rugg-Gunn, Newcastle University
45. SafeFOOD
46. Professor Chris Seal, Newcastle University
47. Sig-Nurture Ltd
48. Sugar Nutrition UK
49. The Health Associates
50. UCL Dental Public Health Group
51. UK Health Forum
52. Unilever
53. Union of European Beverages Associations
54. Whitby Seafoods (Graham Whittle)
55. Which?
56. Ms Carol Williams and Dr Peter Watt, University of Brighton
57. Professor Jack T Winkler, London Metropolitan University
58. Professor Christine Wu, University of Illinois

Table 1: Definitions

	Submitter	Comments	Action agreed by SACN
Sugar and fibre definition: support	MRC Human Nutrition Research	The move to the internationally comparable definitions of free sugars and fibre defined by AOAC method 2009.01 and away from the more UK-specific terms non-milk extrinsic sugars (NMES) and non-starch polysaccharides (NSP) will enable better international comparisons and interpretation of the international scientific research literature, which will support translation into UK public health nutrition messages/policies.	SACN thanked the respondent for their comments.
Sugars definition: support	Action on Sugar	We agree that the UK adopts the definition of 'free sugars' in place of 'non-milk extrinsic sugars'. The definition of free sugars is similar to non-milk extrinsic sugars which is used exclusively by the UK and does not lend itself to being easily understood compared to the term free sugars or added sugars. How weaning foods fits in to this category, needs to be more clearly defined. The inclusion of fruit juices in the definition of free sugars will likely require some adjustment to the existing 5-a-day fruit and vegetable message. We caution that this term is not currently recognised or understood by UK consumers and will need educational reinforcement. We also agree that the term 'sugars' is used, because this enables other sugars (e.g. glucose, fructose, lactose) to be included in addition sucrose. This is important because it will ensure that any replacement of sucrose by high fructose corn syrups (isoglucose) in the production of food and drinks is captured.	SACN thanked the respondents for their comments. Weaning foods are outside the remit of the Carbohydrates and Health report. The recommendations are intended for age groups from two years upwards. When fruit is processed, for example during maceration or blending, the physiological response following consumption is different compared to intact fruit. Therefore weaning foods might contain free sugars although a proportion of the sugars derived from fruit, for example, may still be contained within the cellular structure of the fruit. Points on 5-a-day and consumer messaging are outside of SACN's remit.
	ASO	ASO agrees with the proposed use of the terms fibre and free sugars. However, it will be important to ensure careful communication of these changes, and to consider the implications for labelling, ongoing	SACN thanked the respondent for their comments. Issues around consumer messaging and labelling are outside

	Submitter	Comments	Action agreed by SACN
		population monitoring and messages for the public.	SACN's remit.
	British Dental Association	We support the adoption of the free sugars definition.	SACN thanked the respondent for their comments.
	British Dietetic Association	The BDA supports the adoption of the term "Free Sugars", with some additional comments for consideration: There is a potential for confusion to arise because although lactose is excluded from the term "Free Sugars", lactose is 'free' i.e. outside of the cell wall (see risk management table for remaining comments on this issue).	SACN thanked the respondent for their comments. The definition for sugars was carefully deliberated by SACN.
	British Nutrition Foundation	We support the adoption of the term free sugars as it aligns with terminology used by WHO in its recent report. We agree that this simplifies the estimation of free sugars content as processed fruit does not need to be taken into account but note that, like NMES, 'free sugars' content per se cannot be determined in the laboratory and is not the definition required by EC food labelling legislation (which requires labelling of total sugars, which can be measured directly). Communications activities associated with this recommendation will need careful consideration and attention to detail to ensure that the new terminology is understood and interpreted appropriately.	SACN thanked the respondent for their comments. Communication around the change in definition is outside of SACN's remit.
	Cardiff Vale UHB	Agree that the UK should adopt the definition of free sugars (all monosaccharides and disaccharides added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups and unsweetened fruit juices).	SACN thanked the respondent for their comments.
	Dairy UK	Dairy UK welcomes the change from the definition of "non-milk extrinsic sugars" to that of "free sugars", as it simplifies calculations and is in line with terminology used by the World Health Organisation, making future UK findings comparable to international data.	SACN thanked the respondent for their comments.

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		Because there is no evidence of adverse effects of consumption of intrinsic sugars and those naturally present in milk and dairy products, it is important that these are clearly excluded from the definition of "free sugars". Dairy UK finds that the wording of the report highlights this fundamental distinction in a satisfactory manner. As assessed by the COMA Panel in 1991, in addition to chemical differences between sugars, physiological effects depend on the physical presentation of the sugars – whether free in solution, or an integral part of the cellular structure of the food. When sugars are consumed as part of the cellular structure of the food, there has been no suggestion of any adverse effects [1]. This has been confirmed within the draft WHO report on free sugars released in 2014 [2]. The COMA Panel also concluded that there is no evidence that lactose in milk and milk products have adverse effects on health [1]. Furthermore, sugars naturally present in milk and milk products are found in combination with other beneficial nutrients and dairy products are an important source of vitamins and minerals in the British diet [3].	
	Heart of Mersey (Food Active)	The adoption of the term 'free sugars' is welcomed. In addition to being consistent with the WHO guideline, it reduces confusion in current terminologies which include non-milk intrinsic sugars or added sugars. However, there remains a labelling issue as sugar in foods is described as total sugar, and currently there is no way of identifying free sugars. This is confusing with products such as fruit yoghurts, where there is a significant contribution of lactose, which while being in the free form, is not classified as a free sugar.	SACN thanked the respondent for their comments. The issue of labelling is outside of SACN's remit but as noted by the respondent, lactose naturally found free in milk and milk products is excluded from the proposed definition of free sugars. Sugars added to yogurts would be considered free sugars as would lactose extracted from milk and

[1] COMA (1991) *Dietary Reference Values for Food Energy and Nutrients for the United Kingdom.* London: HMSO.

[2] WHO (2014) Guideline: Sugars Intake for Adults and Children. [draft in consultation, accessed 12/08/14].

[3] Department of Health (2014) National Diet and Nutrition Survey: Headline Results from Year 1, 2, 3 and 4 (combined) of the Rolling Programme 2008/2009 – 2011/2012.

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			milk products and added to food or drinks.
	Hywel Dda UHB	I wish to record that I agree with the definition of free sugars to be adopted in the UK.	SACN thanked the respondent for their comments.
	Professors James & Sheiham	The SACN report correctly mentions the 2003 WHO 916 expert report as using the term "free sugars" but then having rejected the rather cumbersome UK term of " non- milk extrinsic sugars" the SACN report suddenly also now defines the component as "free sugars" but then indicates that it differs from that used by WHO in 2003. In practice the only addition seems to be the inclusion of syrups (paragraph 11.7). This is a helpful emphasis as it would also be accepted as appropriate by WHO.	SACN thanked the respondent for their comments.
	Dr Madden & Dr Vafeiadou	We welcome the use of the term ‘free sugars’ as it is more accessible for consumers than non-milk extrinsic sugars.	SACN thanked the respondent for their comments.
	NICE	NICE agrees with the proposed use of the terms fibre and free sugars both from nutritional and pragmatic points of view (for example, enabling better comparison with international data).	SACN thanked the respondent for their comments.
	Nutrition Society	Sugars: Free sugars term It is important to have a term that provides distinction from the sugars present in milk products and intrinsically in fruit and vegetables, as dietary advice should be targeted at reducing free sugars rather than total sugars, which could impact negatively on the milk, fruit and vegetable food groups. The challenge of achieving measurements of free sugars has been cited as an obstacle for the use of this kind of term. The fact that labelling requirements are for total sugars, with no realistic expectation of including	SACN thanked the respondent for their comment. Reviewing the guideline daily amounts value for sugars adopted by industry for front of pack labelling is beyond SACN’s remit.

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		a separate free sugar category, should not prevent guidelines based on free sugars. In practice most of the sugars present in packaged products are free sugars, with less than 10% of the total sugar consumption from packaged products coming from intrinsic and milk sugars (NDNS data). The proposed DRV population average of 5% of energy from free sugars would suggest that the guideline daily amounts value adopted by industry for front of pack labeling purposes should be revisited.	
	Nutrition Society	The main comment on this report should really be in connection with the recommendations. In regard to sugars I think the use of the term “free sugars” rather than non-milk extrinsic sugars is an excellent idea and much easier to explain than NMES.	SACN thanked the respondent for their comments.
	Nutrition society	Changing the term ‘non-milk extrinsic sugars’ with a term more easily grasped by non-nutritionists and is used by other countries would be welcome: ‘free sugars’ is probably the best alternative term as long as what is included is made absolutely clear.	SACN thanked the respondent for their comments.
	PHE – Dental Public Health	The report outlines the intention to change terminology from non-milk extrinsic sugars (NMES) to ‘free sugars’ this is very welcome as the term is more easily understood by lay audiences. However as the review states it requires clear definition in the UK as terminology varies in other countries. It is also important to note that the two terms are not synonymous (with NMES including an arbitrary 50% of the weight of sugars in canned dried or stewed fruit).	SACN thanked the respondent for their comments.
	Professor Rugg-Gunn	I agree with the change to the term 'free sugars' (Paragraphs 11.7, 12.26); despite being a member of the COMA panel which created 'NMES'. This aligns with WHO terminology.	SACN thanked the respondent for their comments.
	Safefood	The changes in the definitions from ‘non-milk extrinsic sugars’ and ‘non starch polysaccharides’ to ‘added sugars’ and ‘dietary fibre’ are	SACN thanked the respondent for their

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		welcomed. Particularly from the point of view of a cross-jurisdictional body, as it makes international comparison easier and results in less confusion by 'non-experts'.	comments.
	UCL Dental Public Health Group	The proposed use of the term free sugars is welcome but would this include fruit purees and dried fruit? Both these items are potentially cariogenic. (See point 11.7 page 200).	When fruit is processed, for example during maceration or blending, the physiological response following consumption is different compared to intact fruit. Fruit purees contain free sugars, although a proportion of the sugars may still be contained within the cellular structure of the fruit. Sugars in dried fruits are not included in the proposed definition for free sugars.
	UK Health Forum	UKHF agrees with the proposed adoption of the term 'free sugars'. We consider that consistent terminology will aid clearer communication and guidance around sugar consumption. The change of terms used will need to be explained and reinforced in communications to relevant professionals and advice provided to the public. This should include explaining the implications of the revised carbohydrate recommendations in terms of foods people should choose to eat.	SACN thanked the respondent for their comments. Communication around the change in definition is outside of SACN's remit.
	Ms Carol Williams and Dr Peter Watt	We welcome the move away from the terminology of non-milk extrinsic sugars which was little understood by the public and not used internationally, and instead referring to 'free sugars' as used by the WHO. However, we recommend that the definition of 'free sugars' is further strengthened to fully capture sugars which are not 'contained within the cellular structure of foods' [SACN 11.7], recognising that some of these food items were less common at the time the WHO report was published in 2003. Such foods which currently fall outside the WHO definition include:	SACN thanked the respondent for their comments. When fruit is processed, for example during maceration or blending, the physiological response following consumption is different compared to intact fruit. Fruit smoothies and purees contain free sugars, although a proportion of the sugars may still be contained within the

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		a. fruit smoothies b. fruit purees c. fruit puree concentrate (as distinct from fruit concentrates) d. dried fruit	cellular structure of the fruit. Sugars in dried fruits are not included in the proposed definition of free sugars.
	Which?	We also support the proposed definition for free sugars which we consider will help to ensure clearer communication and guidance around sugar consumption.	SACN thanked the respondent for their comments.
	ASO	We would welcome consideration of the contribution of alcoholic beverages to intake of free sugars (highlighted within the body of the report but not the overall summary and conclusions).	SACN agreed that the report should consistently refer to total energy. A statement has been added to the report to clarify that the reference point throughout the report is total energy, while recognising that some people derive some of their energy intake from alcohol.
	NICE	We would welcome consideration of the contribution of alcoholic beverages to intake of free sugars (highlighted within the body of the report but not the overall summary and conclusions).	SACN thanked the respondent for their comments. The recommendation for free sugars stands regardless of where they come from.
Sugars definition: criticism	British Association for the Study of Community Dentistry	If terminology is changed from non-milk extrinsic sugars (NMES) to free sugars it will require clear definition for the UK as terminology varies in other countries. It is also important to note that the two terms are not synonymous.	SACN noted the comments made by the respondent.
	Dairy UK	In the context of the new proposed intake of free sugars at 5% of energy, Dairy UK believes that clarification is required regarding the distinction between the different foods containing free sugars. Some of these are	SACN thanked the respondent for their comments. Lactose naturally present in milk and milk products would be excluded

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		also nutrient-rich foods which make important contributions to the diet's nutritional adequacy and do not appear to be associated with adverse health outcomes; examples include flavoured milks and sweetened yogurts. These should be clearly distinguished from foods which are nutritionally poor and which provide empty calories. The recommendation to halve free sugar intake may be potentially harmful if this does not account for the nutritional value of the products it is likely to affect. A portion of the population, especially children, may not like the taste of plain, unflavoured milk or natural yogurt. Flavoured milks and yogurts therefore provide a useful means of boosting the population's vitamin, mineral and protein intake. For example, a 150g pot of low-fat fruit yogurt is a source of protein, calcium, vitamin B12, riboflavin, potassium, phosphorus, iodine and thiamin. Flavoured milk is a source of protein, riboflavin, potassium, calcium and phosphorus. It is important to note that a number of studies show that yogurt consumption has a neutral or beneficial effect on weight status [4, 5]. Other studies have shown that consumption of flavoured milk is associated with better overall diet quality without any adverse impact on weight [6, 7, 8]. With regards to oral health, although evidence on consumption of flavoured milk and yogurt is sparse, some research suggests that yogurt may reduce the prevalence of dental caries in children[9]. Milk and milk products contain nutrients that have been shown to have anticariogenic properties, including calcium, phosphate, casein and lipids [10]. At policy level, it will be important to take these differences into account	from the definition of free sugars. However, sugars added to milk and milk products would be considered free sugars. SACN's recommendations include advice on dietary patterns which could help achieve levels of free sugars and dietary fibre recommended in the report. PHE is considering the implications of the

[4] Mozaffarian D et al. (2011) Changes in diet and lifestyle and long-term weight gain in women and men. N Engl J Med 361:2392-404.
[5] Wang H et al. (2003) Longitudinal association between dairy consumption and changes of body weight and waist circumference: the Framingham Heart Study. Int J Obes 1–7.
[6] Nicklas TA et al. (2013) The nutritional role of flavoured and white milk in the diets of children. J School Health 83(10): 728-733.
[7] Fayet F et al. (2013) Australian children who drink milk (plain or flavored) have higher milk and micronutrient intakes but similar body mass index to those who do not drink milk. Nutr Res 33: 95-102.
[8] Murphy MM et al. (2008) Drinking flavored or plain milk is positively associated with nutrient intake and is not associated with adverse effects on weight status in US children and adolescents. J Am Diet Assoc. 108:631-639.
[9] Tanaka K et al. (2010) Intake of dairy products and the prevalence of dental caries in young children. J Dent. 38:579–83.
[10] Aimutus WR (2004) Bioactive properties of milk proteins with particular focus on anticariogenesis. J Nutr 134: 989S–995S.

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		when proposing food recommendations, educating consumers and applying any other measures (e.g. fiscal or restrictions on advertising). Specifically with regards to educating consumers, it is important that they are provided with clear and straightforward information on the distinction different types of sugar and the difference between products with added sugars which are nutritionally poor and rich.	recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers.
	ENSA	ENSA would like to highlight its concerns regarding the exclusion for lactose from milk and milk products in the setting of intake recommendations of sugars. Such an exemption may directly and indirectly lead to misinformation and discrimination for food products which are nutritionally equivalent to milk and milk products, such as soy drinks and other soy foods. All sugars provide the same energy (kcal) and the body deals with mono- and di-saccharides in the same way independent of the source. Therefore, sugars naturally present in milk (lactose) or sugars added to soy drinks are absorbed in the body in a similar way, provide the same energy and should therefore be treated equally in recommendations. The daily intake of lactose contributes to 10-13 % of the total sugars intake which is a considerable amount. Excluding lactose from the debate is therefore misleading and denying consumers the right for information. Plain dairy milk naturally contains 5g of lactose per 100ml. In soy drinks, sugars are added for a consumer-friendly taste. However, even after this addition, soy drinks have a lower sugars content compared to dairy, e.g. plain calcium-enriched soy drink only contains 2.8 g sugars/100ml. From a nutritional point of view, there is no scientifically justifiable reason to treat milk products which naturally contain sugars (lactose) differently from products which contain added sugars, as long as the overall sugars content and the nutritional value is the same. Soy drinks are clearly different from sugar-sweetened beverages since they contain important nutrients such as high quality protein, fats and	While all sugars provide the same energy, lactose as consumed in dairy products has reduced cariogenicity; therefore it is justified to make this distinction. If lactose or other sugars are added to soy drinks and foods, they would be considered a source of free sugars.

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		carbohydrates but also vitamins and minerals. Soy drinks have a nutritional composition which makes them fit perfectly in a healthy balanced diet.	
	Grocery Manufacturers Association	The inclusion of naturally-occurring sugars in fruit juice and sugars" definition puts into question the consumption of 100% fruit juice and fruit concentrates. Research consistently shows the consumption of 100% juice is associated with better diet quality and increased intake of essential nutrients. Additionally, no association was found between 100% juice consumption and body weight or adiposity measures.	SACN disagree that the definition for free sugars call into question the consumption of 100% fruit juice; however note that there is a balance to be struck between benefits and adverse effects (i.e. sugar content). SACN therefore recommend that if drinking fruit juice it should be limited to the portion size mentioned in PHE's advice.
	Nutrition Society	I do not think that using free sugar instead of extrinsic will solve the confusion around this issue. I agree with authors in the fact that extrinsic sugar and non-milk extrinsic sugars are not the best terms to use in the future. It causes confusion among my students rather than a public member. However, this issue is still not resolved by replacing it by free sugar as defined by WHO. The term "added sugars" as used in the US seems to be the best option in terms of health and food labelling. I have the following reasons for that: - Consumers want to know if the sugar is added or it is inherently found in foods, and this is very relevant to health. There is no evidence that the form is of significance in unprocessed foods. - The term free sugars equalise the value of free sugars found in fruit juice or smoothie with the value of sugars added during the processing. Why free sugars found in fruit juices would be equalised with sugars that are adding during processing? This can be really a misleading food label. I suggested using added sugars vs. non-added sugar (or intrinsic, natural, native or innate). I do not why "intrinsic" was originally coined to mean those which are contained within the cell, while it could perfectly mean all sugars that naturally exist either free or within the cells. Why we need to worry about the form of the sugar if it exists naturally in food?	The definition of sugars was carefully deliberated; SACN stand by the definition of free sugars.

	Submitter	Comments	Action agreed by SACN
		People will never consume high amounts of naturally occurring free sugars if they use it in foods. If it extracted/concentrated and added to other foods, then it is added sugar. It is as simple as that.	
	Sugar Nutrition UK	We feel that the use of the term 'total sugars' is more appropriate than the proposed ‘free sugars’ because 'total sugars' conforms to EU/UK labelling regulations and would avoid consumer confusion. Free sugars cannot be differentiated analytically from those sourced from within the cellular structure of plant foods. Moreover, the inferred assumption that fruit sugars in fresh fruit (along with canned, dried and stewed) will not affect tooth decay, or contribute to energy intake in the same manner as ‘free sugars’ is not supported by the evidence in this draft Report. In addition, clarity is required as to whether the draft recommendations refer to dietary or total energy intakes as these terms are used interchangeably within the draft Report. (page 7)	The definition for sugars was carefully deliberated, SACN stand by the definition of free sugars. SACN did not identify evidence that fresh fruit would have the same effects as free sugars. In addition the Committee recognise that fresh fruit (along with the other categories listed) contributes other dietary components which have the potential to deliver health benefits, whereas free sugars do not. SACN agreed the report should consistently refer to total energy. A statement has been added to the report to clarify that the reference point throughout the report is total energy, while recognising that some people derive some of their energy intake from alcohol.
Fibre definition: support	Professor Chris Seal	I welcome the recommendation to adopt the revised definition of dietary fibre in place of NSP, noting that this will require changes to product labelling and public health messages.	SACN thanked the respondent for their comments.
	Nutrition Society	The move (or return) to the term dietary fibre is also welcomed as I believe that the DRV for NSP is now confusing given that food labels were using the AOAC definition of dietary fibre. I understand that the	SACN thanked the respondent for their comment.

	Submitter	Comments	Action agreed by SACN
		amount of dietary fibre is no longer used with the new food labelling legislation but products that make a claim will still need to declare it.	
	Unilever	We broadly support the recommendations on fibre. The recommendations align with most of the evidence base and international guidance, by using AOAC definition of dietary fibre. It includes materials with a degree of polymerisation ≥3 units, and allows for specific isolated, extracted and synthetic fibres, with the condition that their beneficial physiological effects have been shown.	SACN thanked the respondent for their comments.
Fibre definition: criticism	Calorie Control Council	We support the inclusion of fibres with three or more degrees of polymerization in the SACN proposed dietary fibre definition of "all carbohydrates that are naturally integrated components of foods and that are neither digested nor absorbed in the small intestine and has a degree of polymerisation of three or more monomeric units, plus lignin." Restricting the fibre definition to "naturally integrated components of foods," however, is not consistent with most other dietary fibre definitions such as those of Codex, the European Union, Food Standards Australia New Zealand (FSANZ), Health Canada, the Institute of Medicine (IoM), and the recent United States Food and Drug Administration (FDA) proposal. It is further problematic that the proposed definition does not align with that of the European Union (EU), as the EU"s definition is the one on which the food labelling regulations are based. Additionally, restricting the fibre definition to "naturally integrated components" would exclude extrinsic fibres with demonstrated physiological benefits. The draft guidance notes that there are physiological beneficial effects for the following fibres although these would seem to fall outside the proposed dietary fibre definition: non-digestible oligosaccharides and faecal weight (Section 9.23), fructo-oligosaccharides (Sections 9.26 - 9.27) and faecal bacteria, galacto-oligosaccharides (GOS) (Sections 9.28 – 9.29) and faecal bacteria, resistant starch and faecal weight (Sections 9.38 – 9.42), and oat bran	SACN thanked the respondent for their comments. SACN thanked the respondent for highlighting this error. The definition of dietary fibre was intended to be in line with the Codex definition and not be limited to carbohydrates that are naturally integrated components of food; the phrase 'naturally integrated components of food' has been removed from the definition of dietary fibre.

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		and isolated β-glucan (Section 12.17).) The EU definition of dietary fibre includes physiological benefits such as colonic fermentation, which is omitted from SACN‟s proposed definition. The EU has also authorized a health claim for polydextrose that points to the reduction of postprandial glycaemic index when it is used in place of sugar. There is substantial scientific agreement that colonic fermentation and attenuation of postprandial glycaemia/insulinemia are physiologic benefits of fibre as evidenced by the scientific consensus at the 9th Vahouny conference. Most dietary fibre definitions focus on the physiological benefits of the fibres, not whether they are intrinsic or extrinsic to a food. Likewise there are no analytical methods available that can differentiate between intrinsic and extrinsic fibres. Because all dietary fibres with one or more demonstrated physiological benefits can be of value, we believe the focus should be on total dietary fibre intake rather than the origin of the fibre.	Changes to the intestinal microbiota are not considered a beneficial physiological effect in themselves. The draft report does not include a full review of the beneficial physiological effects associated with consumption of dietary fibres and those detailed are not a comprehensive or exclusive list. There may be other beneficial physiological effects of dietary fibres and the list may be added to in the future. The text in the introduction and summary and conclusions of the dietary fibre chapter has been amended to address this point.
	Clasado	[Regarding the review's proposed definition of fibre] the use of the expression ‘naturally integrated components of food’ needs clarification. What does ‘naturally integrated’ mean? Does this exclude or include Food Supplements or foods enriched with fibre? Does this mean that the ‘isolated dietary fibres’ mentioned in the last bullet point in section 12.27are included or excluded from potential health benefits?	SACN thanked the respondent for highlighting this error. The definition of dietary fibre was intended to be in line with the Codex definition and not be limited to carbohydrates that are naturally integrated components of food; the phrase ‘naturally integrated components of food’ has been removed from the definition of dietary fibre.
	Fibre Consortium	Whilst we welcome the inclusion of the degree of polymerisation (DP) of three and higher, the restriction to only ‘naturally integrated components of foods’ is not consistent with most other dietary fibre (DF) definitions, including those from Codex (2009), EFSA (2012), the European Commission (2008), FSANZ (2001), Health Canada (2012), IoM (2005), and the recent US FDA proposal (2014).	SACN thanked the respondent for highlighting this error. The definition of dietary fibre was intended to be in line with the Codex definition and not be limited to carbohydrates that are naturally integrated components of food; the phrase ‘naturally integrated components of food’ has been

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		Industry is required to operate under the EU definition of dietary fibre set out in Commission Directive 2008/100/EC, which sets regulations for the sole purposes of food labelling and includes beneficial physiological effects such as colonic fermentation (see page 1 of response for specifics). Thus, we believe that isolated and extracted fibres should also be included in the proposed SACN definition of DF. As the draft SACN report states, there are certain extracted or isolated dietary fibres where a beneficial physiological effect has been demonstrated, but for the effect to be manifest these need to be consumed at higher levels than would be expected in a typical UK diet, including: • Non-digestible oligosaccharides and faecal weight (Section 9.23). • Fructo-oligosaccharides (Sections 9.26 - 9.27) and GOS (Sections 9.28 – 9.29) and faecal bacteria. • Resistant starch and faecal weight (Sections 9.38 – 9.42). • Oat bran and isolated β-glucan (Section 12.17). This evidence is in contrast to the statement given in Section 11.22 (p209). 'At this time, it is not known whether extracted or isolated dietary fibres would convey the range of health benefits associated with the consumption of DF rich foods'. The Fibre Consortium believes therefore that this aspect would benefit from some clarification, e.g. Wouldn't these ingredients fall within the scope of any newly developed DF definition, if they have been shown to have a beneficial physiological effect? If not, how would this position sit alongside: • The methods used to measure dietary fibre. • The food labels of products containing these ingredients and those fibre ingredients already meeting the EU definition of dietary fibre? • How would healthcare practitioners use the different DF definitions in assessing and advising people regarding DF intakes and	removed from the definition of dietary fibre. Changes to the intestinal microbiota are not considered a beneficial physiological effect in itself. The draft report does not include a full review of the beneficial physiological effects associated with consumption of dietary fibres and those detailed are not a comprehensive or exclusive list. There may be other beneficial physiological effects of dietary fibres and the list may be added to in the future. The text in the introduction and summary and conclusions of the dietary fibre chapter has been amended to address this point. SACN does not consider that the evidence is in contrast with the statement highlighted by the respondent. The report states that dietary fibre intake should be achieved through a variety of sources. Cautious wording has been used because at this time it is not known whether extracted or isolated dietary fibres would convey the' full ' range of health benefits associated with the consumption of dietary fibre rich foods. Issues of methodology, labelling and the application of the dietary fibre definitions by health professionals are outside SACN's

	Submitter	Comments	Action agreed by SACN
		recommendations?	remit.
		The report (and SACN's 2008 draft position statement on dietary fibre) requires extracted natural carbohydrate components or synthetic carbohydrate products to show 'clear evidence of a physiological effect before they can be assumed to be as effective as whole foods intrinsically containing fibres'. Whilst the SACN perspective is restricted to a limited number of specific health outcomes, the requirement per se for ingredients to demonstrate a relevant beneficial physiological effect to meet a DF definition is consistent with other jurisdictions and/or recommendations. …	SACN thanked the respondent for highlighting this error. The definition of dietary fibre was intended to be in line with the Codex definition and not be limited to carbohydrates that are naturally integrated components of food; the phrase 'naturally integrated components of food' has been removed from the definition of dietary fibre.
		Whilst we understand that the SACN remit is restricted to a limited number of specific health outcomes, the differences between the SACN definition and the European regulatory environment could potentially cause considerable confusion. We therefore respectfully request that SACN revisit its list of beneficial physiological effects. Furthermore, we would ask SACN to provide clarification regarding which health end points SACN views as beneficial physiological effects in the context of its review of colorectal health and specific disease outcomes, as the draft report and Chapter 11 of the supporting documents are not currently aligned. (See pages 2 and 3 of the response for specific details).	
		In the DF definition recommendation (Section 11.22 p208), it is stated that DF is to be chemically defined by AOAC 2009.01. Although we agree that this recent method (together with AOAC 2011.25) covers the full range of the DF definition from a DP point of view (≥3) and also all isolated and synthesised non-digestible carbohydrates, the use of the other established AOAC methods, as adopted by Codex Alimentarius (Codex standard 234-1999, 2013 revision), should also be included in the final report. This approach would be consistent with the European Commission Guidance Document for Competent Authorities with regard to Methods of Analysis for the Determination of the Fibre Content	SACN thanked the respondent for their comments. SACN has removed references to specific AOAC methodologies in the recommendations as it outside the committee's remit to advise on this; however the different methods are noted as background information. The report now states that dietary fibre should be measured using the prevailing AOAC methods in accordance with regulatory authorities' guidance or requirements.

	Submitter	Comments	Action agreed by SACN
		declared on a Label, December 2012. Although we agree method AOAC 2009.01 is still a fairly recent one, we do not agree that the DRV for DF at 30g for the adult population should be defined by using only AOAC methods 985.29 and 991.43. As referred to above, there are a wide range of methods that should be used to capture all fibre entities (whether for nutrition labelling or establishing dietary reference values). Although footnote 10 states that these methods do not measure all of the components of DF as described in the DF definition, we would like to repeat our support for the use of the full range of AOAC methods as mentioned above, allowing for selection of the most appropriate method, depending on the type of fibre(s) that is in the food.	Newer methods for determining dietary fibre content will encapsulate all the components included in the proposed definition.
	Professors James and Sheiham	The SACN group seem to have essentially adopted the WHO definition of "free sugars" and it is a pity that it did not follow suit when considering the WHO definition of fibre as non - starch polysaccharides. The new SACN choice, much favoured by the food industry, includes lignin and maillard products with no known advantageous biological effects, and will allow the food industry to add a range of ingredients of dubious biological value. These issues have been well considered by other major international groups including WHO and it is regrettable that SACN has suggested this new approach. The SACN report does set out the Codex committee's criteria whereby the committee indicates that resistant starch should not be included in the definition of dietary fibre (Section 2.29) but then does not follow the logic of relying on non - starch polysaccharide as the key component and plumps for the new AOAC methods as appropriate. Given the notorious influence that the food industry has on Codex deliberations it is not surprising that Codex opted for this AOAC approach because the industries are interested in magnifying the fibre value by choosing a method (with the newer AOAC techniques) which maximises the carbohydrate components involved. The AOAC method also attempts to measure resistant starch but in practice often does not assess the	The SACN definition of dietary fibre was intended to be in line with the Codex (2009) definition which states that "Dietary fibre means carbohydrate polymers with ten or more monomeric units, which are not hydrolysed by the endogenous enzymes in the small intestine of humans." and which also allows for the inclusion of lignin and other minor components naturally associated with the polysaccharides of the cell wall. The phrase 'naturally integrated components of food' has been removed from the definition of dietary fibre.

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		amount actually consumed. If rice, for example, starts to cool before eating or if reheated - a very frequent occurrence in many societies - then retrogradation of starch begins immediately so the AOAC values will actually underestimate the amount of resistant starch actually present in the meal as eaten. If the AOAC analyses are undertaken by the industry itself for labelling their processed foods then they can maximise the fibre value by arranging for their foods to cool completely before starting the analysis. The AOAC method also provides, for example, a figure for "fibre" which in practice in some products like cornflakes largely reflects the fact that maillard products (with no assumed metabolic effects) are included in the term "fibre". The discussion in the UN report on dietary fibre by the UK and world experts (Cummings and Stephen - who do not seem to have been consulted for their expertise) also shows how the SACN choice of the AOAC method of definition is conditioned it would seem by the finding that oligosaccharides as well as resistant starch can promote faecal bulking. Yet most of the world literature relates to the older AOAC methods which do not include these components- see Section 11.5.The SACN expert group may not know that the choice of the AOAC by US groups, usually closely linked to the food industry, came after decades of nutritional analyses in the US where almost all their dietary studies (on which a number of analyses in the SACN report depend) did not measure carbohydrates at all. They just inferred its quantity from crude analytical measures of the residual dry weight of a food once the protein (by nitrogen analyses only), the fat and ash content of the dried matter had been quantified. The SACN expert group specify that their definition of fibre is of “carbohydrates that are naturally integrated components of foods and that are neither digested nor absorbed in the small intestine and has a degree of polymerisation of three or more monomeric units, plus lignin". They do not specify why they include lignin and maillard products when they have no proven health benefit, and the inclusion of carbohydrates with a DP of 3 or more is made despite the physiology of the handling of these 3-10 carbohydrates being totally different from those of non-starch	

	Submitter	Comments	Action agreed by SACN
		polysaccharides.	
	MRC Human Nutrition Research	It is not entirely clear from the report which AOAC method should be used for updating food composition tables. For example, page 208 (point 11.2) SACN recommend switching to AOAC method 2009.01 for determining dietary fibre. However, in the next point SACN define the new recommended DRV using the old AOAC methods 985.29 and 991.43. The footnote (10) states that this may need to be revised as the more recent Association of Official Analytical Chemists methods begin to be widely used.	SACN thanked the respondent for their comments. SACN has removed references to specific AOAC methodologies in the recommendations as it outside the committee's remit to advise on this; however the different methods are noted as background information. The report now states that dietary fibre should be measured using the prevailing AOAC methods in accordance with regulatory authorities' guidance or requirements. Newer methods for determining dietary fibre content will encapsulate all the components included in the proposed definition.
	Nutrition Society	It is important to have this functional division of carbohydrates based on gastrointestinal fate, not least due to its impact on energy calculations. It is also necessary to have a term to describe carbohydrates entering the colon that is distinct from the term Dietary Fibre for which a separate definition has been adopted. In the SACN report the terms 'digestible' and 'non-digestible' have been used: 2.3. …. Digestible carbohydrates are absorbed and digested in the small intestine; non-digestible carbohydrates are resistant to hydrolysis in the small intestine and reach the human large intestine where they are at least partially fermented by the commensal bacteria present in the colon…..	Terminology used to classify carbohydrates based on their digestion and absorption in the small intestine was carefully considered. It was the opinion of the expert committee to use the generally accepted terms digestible and non-digestible carbohydrates.

	Submitter	Comments	Action agreed by SACN
		In essence the full terms are therefore: 'Digestible in the small intestine' 'Non-digestible in the small intestine' It is necessary to make this distinction as 'digestion' can encompass a number of mechanisms depending on the context in which it is used. Digestion is often used to describe the whole process of energy/nutrient recovery occurring in the whole GI tract. The contribution of the products of colonic fermentation to energy is an example whereby the use of 'non-digestible' could be misleading if taken out of context. It is also for this reason that the term 'unavailable carbohydrates' is no longer in common usage. Furthermore, use of the pre-fix 'non-' represents an absolute which does not necessarily best reflect the variance that occurs within the normal physiological range with resistant starch defined as 'the sum of starch and starch degradation products that on average reach the small intestine'. Another approach to this division are the terms 'available carbohydrates' and 'resistant carbohydrates' (Englyst et al 2007. EJCN 61, S19-39): Available Carbohydrates: (Available as carbohydrates for metabolism): consist of the sum of carbohydrates that are digested and absorbed in the small intestine providing carbohydrates for metabolism. This is equivalent to the longstanding usage of 'available carbohydrates', the focus of which is 'available for metabolism as carbohydrate' and therefore links directly to the energy contributing property. Resistant Carbohydrates: (Digestion resistant carbohydrates): consist of the sum of carbohydrates that either resist hydrolysis by the endogenous enzymes of the small intestine, or are poorly absorbed and/or metabolised. In terms of concept, the prefix 'resistant' may be considered as less absolute than the prefix 'non'. This is of relevance not only in the context	

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		of resistant starch as noted above, but also within the broader definition of digestion encompassing nutrient release and absorption in the colon. Therefore the term 'resistant', which provides a better representation of a blurred boarder, may be considered as better reflecting that the digestion process does not necessarily stop on entry to the colon for those carbohydrates that have resisted digestion in the small intestine. It is proposed that this category include carbohydrates that are 'poorly absorbed and/or metabolised' to better encompass components such as the sugar alcohols which can have varied gastrointestinal/metabolic fate.	
	Nutrition Society	Dietary Fibre: Codex, EC and SACN definitions are not defined by methodology The Codex, EC and SACN definitions of dietary fibre are similar in principle, describing the carbohydrate component escaping digestion in the small intestine but with the added provision that extracted or synthesized components must be demonstrated to have a physiological benefit. Although a departure from other nutrient classifications, these dietary fibre definitions do provide the broad criteria by which to include or exclude various components. The criteria set out in the definition are sufficient description and as outlined below attributing fibre to what is recovered by a single method may be counterproductive. In section 12.27 of the report it states: Dietary fibre should be defined as all carbohydrates that are naturally integrated components of foods and that are neither digested nor absorbed in the small intestine and have a degree of polymerisation of three or more monomeric units, plus lignin. Dietary fibre is to be chemically determined using the Association of Official Analytical Chemists (AOAC) method 2009.01 (McCleary et al., 2010; McCleary et al., 2012). Several aspects of this statement would benefit from clarification to limit	SACN thanked the respondent for their comments. The definition of dietary fibre was intended to be in line with the Codex definition and not be limited to carbohydrates that are naturally integrated components of food; the phrase 'naturally integrated components of food' has been removed from the definition of dietary fibre. SACN thanked the respondent for their comments. SACN has removed references to specific AOAC methodologies in the recommendations as it outside the committee's remit to advise on this; however the different methods are noted as background information. The report now states that dietary fibre should be measured using the prevailing AOAC

	Submitter	Comments	Action agreed by SACN
		inconsistencies: - The definition here is focused on the naturally integrated components only, with the implication that when extracted and synthesised components are present they are considered by a separate set of criteria. This approach would seem to fit best with the current evidence. - The naturally occurring components are: NSP and the small amounts of lignin associated with plant cell wall material; resistant starch, which in the context of most processed foods in the human diet is restricted to RS type 3 only; resistant oligosaccharides, which are limited to fructans (cereals onions etc) and alpha-galactosides (legumes) occurring naturally. These components can be measured specifically by chemical methodologies of which there are several available as recognized by Codex Alimentarious when this topic was considered. - In contrast, the AOAC 2009.01 is the only method specified in the statement. However, the phase 'chemically determined' used in the statement is not consistent with this methodology, which is instead empirical in nature rather than measuring components specifically. The implication is that the method does not provide information on what has been recovered and therefore no possibility of evaluating conformity with the actual definition. The AOAC 2009.01 will recover a wide range of extracted and synthesized components which may or may not conform with the definition. - In terms of measuring RS, for most processed foods that will only contain RS type 3, the AOAC 2009.01 method offers no advantage over the more commonly used AOAC gravimetric fibre methods that also recover RS3. - In terms of measuring the resistant oligosaccharides, the AOAC 2009.01 does this by a refractive index HPLC technique that provides no information on the components measured. Some laboratories have reported inflated values for this part of the method indicating that accuracy may sometimes be an issue for some product types. In practice	methods in accordance with regulatory authorities' guidance or requirements. Newer methods for determining dietary fibre content will encapsulate all the components included in the proposed definition.

	Submitter	Comments	Action agreed by SACN
		fructans and alpha-galactosides can be measured specifically when present, representing viable analytical options for measurement of the naturally occurring oligosaccharides. In summary dietary fibre is now defined by a set of chemical/origin/functional criteria, rather than by what is recovered by a specific method. Any method or combination of methods that correctly identify the dietary fibre components present in foods would be appropriate. Sufficiently detailed analytical tools should be available to provide distinction between component types. Such distinctions are important both for correct labeling and also to ensure that sufficiently detailed information is available to assess the impact of various fibre types in future research studies.	
	Nutrition Society	The suggested change for the UK to use the more physiological definition of fibre is to be greatly welcomed. Although the terms insoluble and soluble fibre are useful when considering mechanism of action they cause confusion to the general public and are probably better replaced by cereal fibre and fibre from fruit and vegetables should a more detailed description be needed. The use of just the term fibre for recommendations should make for a much clearer message. As mentioned above, the impact of fibre in the colon and rectum in respect to gut bacterial populations and function including production of short chain fatty acids, mucosal defence and modification of luminal pH are key research areas in understanding mechanism of action and potential modifiable markers of risk. These effects may not be limited to colo-rectal health as there is the potential for systemic responses such as immunological changes and modification of liver function through SCFA production.	SACN thanked the respondent for their comments; however did not agree that the terms cereal fibre and fibre from fruit and vegetables were representative of soluble and insoluble fibre; insoluble fibre is not exclusive to cereal fibres.

	Submitter	Comments	Action agreed by SACN
	Unilever	Most evidence for benefits of fibres is derived from foods where these are a naturally occurring component of an intact food matrix. The new definition allows greater flexibility to meet recommended levels using isolated, extracted, and synthesized fibres. As the report acknowledges, however, these individual fibres may not provide the full range of established 'fibre' benefits, so their benefits must be demonstrated. Yet specific the same fibres when 'naturally occurring' fibres do not have to carry any specific evidence of their efficacy. We believe that fibres extracted or isolated from foods will be an important vehicle for consumers to meet fibre requirements. Where these share physical and chemical similarity (or identity) to the 'naturally occurring' fibres in food, it may be scientifically unjustified to apply more rigorous criteria for their inclusion within the 'fibre' definition, and this may further act against achievement of recommended fibre intakes.	SACN thanked the respondent for their comments. The definition of dietary fibre was intended to be in line with the Codex definition and not be limited to carbohydrates that are naturally integrated components of food; the phrase 'naturally integrated components of food' has been removed from the definition of dietary fibre.

Table 2: Methodology

	Submitter	Comments	Action agreed by SACN
Methodology: specific comments	Action on Sugar	We direct you to the separately submitted response to SACN from Professor Sheiham and Professor James regarding the evidence, and urge SACN to consider widening the search criteria; in particular we suggest SACN consider including studies published pre 1990, the exclusion of which does not have a strong rationale.	Pre-1990 studies were included in both the oral health and the colorectal health systematic reviews. The cardiometabolic health systematic review examined those pre-1990 studies that had previously been considered by COMA (1991). Those studies that met the inclusion criteria were highlighted by the cardiometabolic health review, but not considered further. The inclusion criteria for the systematic reviews were carefully considered by SACN and cannot be changed now.
	Dr Alexander	*See the full response for details (p1-4).* In summary: [a] Within the grading system it states that expert judgement will be used but it is unclear how the judging process was implemented from the content of the SACN report. Some information is provided in the Cardiometabolic Health Protocol supporting document but the specific application of judgment criteria is not transparent. In addition some relevant guidance information is reported in the SACN Framework for Evaluation of Evidence document, but this document does not describe the application of the framework. It is unclear how the Bradford Hill guidelines, were applied directly to the topic areas summarized in the SACN draft report. Based on the SACN report, the evidence was considered Adequate, Moderate, or Limited (A2.16). This was apparently based on the number of available studies as well as study methodology. However, it is unclear how such grades were implemented based on the content of the SACN report. This was apparently based on the number of available studies as well as study methodology. However, it is unclear how such grades were	[a] In the report, expert judgement was applied to upgrade the conclusions from RCTs on sugars-sweetened beverages and BMI in children and adolescents. Expert judgment was also used in the decision to include studies that did not adjust for tooth brushing in the evidence base on sugar and dental caries. The report notes where expert judgment was used to alter conclusions reached through the grading system. Information bias was not considered because it is largely a problem of case-control studies, whereas SACN considered

	Submitter	Comments	Action agreed by SACN
		implemented based on the content of the SACN report. For example, was information bias considered and if so, how was this methodological factor 'weighed' against other study quality characteristics, such as inadequate adjustment for potential confounding factors? [b] The authors state that, "Evidence was deemed inconsistent according to statistical considerations i.e. in a meta-analysis, when I^2 >75%, the confidence intervals do not overlap or if the results of individual studies are not in the same direction. When the I^2 was greater than 75%, but the forest plot suggested there was evidence of a direction for an outcome expert judgement was used to upgrade the conclusion, where appropriate". This approach to evaluate consistency/inconsistency is not sufficient to appreciate the concept of between-study variation because this approach is based only on statistical heterogeneity, where an I^2 tests indicates the amount of unexplained between-study variation in a meta-analysis model. If significant between-study variability is identified *a priori*, a meta-analysis model shouldn't be generated in the first place unless the authors transparently discuss methodological heterogeneity and then use a meta-analysis to explore sources of between-study variation. This does not appear to be the case in the SACN report [c] While more comprehensive meta-analysis information is provided in the extensive supporting documents, it would be beneficial to the reader if a section on meta-analysis application and evidence review was included in the SACN report (prior to the summary of the evidence). This would provide a framework for evaluation in a more transparent fashion. Meta-analysis methodology is discussed (in brief) under the data analysis sub-heading beginning in section A2.6 of the SACN report. Very little information is presented regarding the utilization and analytical	prospective studies and RCTs. The report's methodology section has been amended in some places to include additional information on the review process. SACN's approach is as described. Much of this coincides with the Bradford Hill criteria, but SACN did not explicitly use these criteria. The report's grading system and upgrading criteria are detailed in annex 2 of the draft report. [b] Expert statistical advice was provided to the committee. Based on this guidance an informed decision was reached on which heterogeneity criteria and meta-analysis models to use in the systematic reviews. The heterogeneity cut off was agreed prior to the systematic reviews being performed and was consistently applied across all three systematic reviews. [c] The concerns raised in relation to the report's methodology were given due consideration during the review process and the concurrent committee meetings. Systematic reviews may take a number of valid approaches and the approach taken in this review was informed by expert guidance.

	Submitter	Comments	Action agreed by SACN
		methodology of meta-analyses in the context of the SACN draft report, however, more relevant information is provided in the Cardiometabolic Health Protocol supporting document. The following concerns are raised: The literature search for the specific topic areas are not provided in the SACN report. A systematic flow chart is lacking for individual topic areas. It is not clear how inclusion/exclusion criteria were applied to specific topic areas. Draft report lacks information on data extraction. It is also unclear how authors synthesised studies on an individual basis as well as collectively. The meta-analytic model building process is absent for each topic area. The types of meta-analysis appear to be somewhat limited. In addition, sub-group analyses should be conducted to identify potential sources of between-study variation, sensitivity and influence analyses should be performed, and publication bias assessments should be generated. It would be beneficial for the reader if this type of information was reported in the SACN draft document so the reader could garner a better appreciation of analytical consistency. It is stated that, "if the result produced an I^2 of more than 75%, the pooled estimate would not be presented because it indicates that there is excessive heterogeneity and the result would have little meaning" (A2.8, pg. 221). While it is true that this is evidence of statistical heterogeneity, it is not clear how the identification of sources of between-study variability were explored. Furthermore, it is not clear if/how such secondary analyses fit into the development of evidence judgments. [d] Based on how the SACN draft report is organized and summarized, it is unclear whether and/or how the very important concepts of consistency	It was not the purpose of the report to reproduce all the information in the systematic reviews. It is appropriate for specific details of the methodologies to be provided in the systematic reviews rather than in the report. [d]

	Submitter	Comments	Action agreed by SACN
		or coherence were considered when judging the evidence *(see final paragraph of Chapter 6 synopsis of full response for details)*	Please refer to response [b] above.
	British Soft Drinks Association	[a] The Draft Report does not follow the standard methodology for reaching conclusions about potential cause and effect relationships that it cited [1, 4]. In particular, the Draft Report does not integrate all the available evidence into a specified framework such as the Bradford Hill criteria [5], instead relying primarily on summary risk estimates from a subset of observational studies combined in a meta-analysis. Also, the Draft Report does not adequately address the entire body of available data and hence, assess the totality of evidence, e.g., by considering the significant inconsistency between the majority of its findings as to sugar and SSBs on the one hand and SSBs and T2D on the other; see paras 6.21, 6.32 and 6.34 [3]. The principles adopted by SACN in reviewing the evidence are clearly defined in Appendix 1 Cardio-metabolic Health protocol [1]. The statistical pooling of evidence allows an effect size to be quantified. In this respect meta-analysis is often the statistical tool of choice and although systematic reviews with meta-analyses are considered more objective than other types of reviews, it has been suggested that their interpretation can be subjective even among reviewers with extensive experience conducting meta-analyses [2]. The Draft Report does not sufficiently evaluate the acknowledged potential for bias and confounding as an explanation for the weak associations found in some underlying studies and in the resulting meta-analysis. [b] Another important consideration is the assessment of the rigor of the pooled estimate. It is stated in Appendix 1 [1] that the principles adopted with reference to heterogeneity do not allow evidence to be included in	[a] The concerns raised in relation to the report's methodology were given due consideration during the review process and the concurrent committee meetings. Systematic reviews may take a number of valid approaches and the approach taken in this review was informed by expert guidance. SACN did not explicitly use the Bradford Hill criteria. The meta-analyses used adjusted estimates from the individual studies. The report acknowledges, in broad terms, the weaknesses of different types of studies. [b] Expert statistical advice was provided to the committee. Based on this guidance an informed decision was reached on which

	Submitter	Comments	Action agreed by SACN
		the report where the I^2>50%. This allows the variation between study estimates to account for half of the total, and this value has been described as indicating medium heterogeneity [6], and as such, a generous standard for inclusion and one where the data require scrupulous interpretation, particularly where the meta-analyses consist of few studies. As detailed [1, 6], it is wholly appropriate that where there is excessive heterogeneity (I^2 greater than 50%) that pooled estimates and meta-analysis are not presented. It is interesting to note that in the Draft Report, the standard for medium heterogeneity is changed from the more commonly used 50%, cited in Appendix 1, to 25-75% and it is stated that analyses will not be presented if the I^2 >75% (see Annex A2.8 [3]). In devising this statistic, Higgins *et al* [6] proposed that low, moderate, and high I^2 values were 25%, 50%, and 75% respectively. Thus 'high' was not designated >75%, nor medium 25-75% rather that values circa 50% were medium (but not +/- 25% units) and when noticeably greater than 50% they would be designated high. Higgins *et al* also state that the I^2 value is a measure of inconsistency and as such allowing analyses to be retained as evidence with up to 75% inconsistency do not appear a sound basis on which to make recommendations for public health. We would ask SACN to reflect on the work of Higgins *et al*, and the established standards for dealing with heterogeneity.	heterogeneity criteria and meta-analysis models to use in the systematic reviews. The heterogeneity cut off was agreed prior to the systematic reviews being performed and was consistently applied across all three systematic reviews. The way this has been performed cannot be changed at this stage. High heterogeneity did not mean the meta-analysis would not be considered (for example where all studies clearly showed an effect), only that the value of the pooled estimate was deemed too unreliable to use. SACN notes a typographical error in the protocol.
	Professors James & Sheiham	We note that the SACN evidence only allows data from limited studies to be appraised if they were published after 1990. New data are not intrinsically better than older work and this partial view may explain the discrepancies between some of the systematic analyses conducted by SACN and others. *See p2 of full response under limitations of general approach.* Limitations of cohort and trial data alone- SACN more conventionally and in keeping with the current WHO process, only uses cohort studies and controlled trials for their analysis and interpretation. This is a pity because	Pre-1990 studies were included in both the oral health and the colorectal health systematic reviews. The cardiometabolic health systematic review examined those pre-1990 studies that had previously been considered in COMA (1991). Those studies that met the inclusion criteria were highlighted by the cardiometabolic health review, but not considered further.

	Submitter	Comments	Action agreed by SACN
		tightly controlled metabolic and clinical studies often provide not only mechanistic insights but also allow one to understand better the severe limitations of cohort studies and the need to discern the significance of the precise setting and criteria used in controlled trials. Cohort analyses have major errors in dietary analysis which are either neglected or purportedly managed by various statistical devices. The SACN authors acknowledge this in their report but one subsequently has little feel for how this altered their judgements. The much vaunted controlled trial can also mislead unless one has a real insight into some of the potential drawbacks arising from the choice of subject, the magnitude of the change in diet envisaged, the nature of the exchange of macronutrients when dealing with sugar or fibre or total carbohydrate intakes. The degree to which the diet is actually controlled as distinct from being prescribed and the duration of the study are also often crucial. Some of these drawbacks are clearly acknowledged in the report and SACN's expert group is to be congratulated on pointing out the many disadvantages of both cohort and trial studies in sections 1.8 to 1.11.but all these caveats do not seem to come in to play and affect the process of evaluation. *See full response p3-4, under limitations of cohort and trial data alone, for further details.* If one considers how these issues apply to the SACN report then the importance of the individual range in responsiveness to defined dietary changes is not mentioned as a fundamental issue because this understanding can only really come from tightly controlled metabolic studies. Section 1.8 simply ascribes the problems incorrectly to only dietary assessment errors. Effects of total carbohydrate and selective components on blood pressure. *See full response on p5 for further details.* At no stage is there mention of the classic DASH trials[i] because SACN, for the reasons already specified, seems to assume incorrectly that only recent studies	The inclusion criteria for the systematic reviews were carefully considered by SACN and cannot be changed now. While DASH was published after the 1990 cut-off, the trials did not meet the cardiometabolic health reviews inclusion criteria as they employed a mixed portfolio diet.

	Submitter	Comments	Action agreed by SACN
		are of high quality and value. This classic trial should therefore have alerted the SACN expert group to recognise that carbohydrate rich diets are usually also rich in potassium (a blood pressure lowering mineral) and other minerals whereas fats are devoid of these minerals. So total carbohydrate does not have a neutral effect on blood pressure if one assesses subjects in energy balance. Carbohydrate intake in relation to dietary energy density and weight gain- The issue of dietary energy density has not really been considered by the SACN experts because they are locked in to cohort or trial data where until recently there were few estimates of dietary energy density. *See p6 of full response for further details.* It seems clear that the SACN review group report may not be conversant with the wealth of new analyses which specify an optimum level of a risk factor when analysing the burden of disease. WHO made a major contribution in developing this concept which illuminates the need globally to consider the global diet and not just the Western "norms". We advocate the continued use of this counterfactual approach and therefore the importance of setting optimum levels. *See p 17 under counterfactual analyses of full response for details.* Quantitative relationship between intakes of free sugars and dental caries: The SACN report needs now to take into account the old evidence, recently made available in English, of the established quantitative relationships between sugars and dental caries and the more recent evidence that there is a major burden of dental caries in middle aged and older adults who have been exposed to fluoridated drinking water for most of their lives. *See p 11-12 of full response for further details*.	Consideration of dietary energy density was outside the scope of this review.
	Nutrition Society	Paragraph 2.21 and also in sections referring to the DRVs such as Chapter 11, while there is reference to dietary recommendations, the definition of dietary reference values (as set in 1991 COMA report) has been neglected. It is unclear what is the approach to dietary reference	SACN's recommended DRVs for total carbohydrate and fibre are discussed in the context of previous COMA recommendations. The approach to

	Submitter	Comments	Action agreed by SACN
		value/s and what is the approach to the 'dietary recommendation' in this current report. Is this report looking at the body of knowledge within the framework of COMA 1991 LRNI, EAR and RNI? If use of the LRNI, EAR and RNI as yardsticks is not methodologically appropriate (e.g. due to variation in energy requirements); this needs to be clarified. Alternatively, if the body of knowledge required for setting these criteria for total carbohydrate, sugars and fibre is inconclusive, this needs to be stated in Chapter 11 to clarify the conceptual framework of producing reference values or recommendations.	setting a dietary recommendation for 'free sugars' is fully explained in the report.

Table 3: Sugars recommendations

	Submitter	Comments	Action agreed by SACN
Sugar DRV: general comments	British Dental Association	Whilst we support the recommended reduction in sugar consumption to five per cent of energy intake, we feel that it will be a challenge even to achieve the current recommendation of 10 per cent.	SACN thanked the respondent for their comments. Achievability of recommendations is beyond SACN's remit and is for the risk managers to consider.
	Professors James & Sheiham	Adult caries should be emphasized in the context of the recommendations relating sugar intakes to dental caries as well as to adult weight gain - we consider that the recommendation should be reworded to highlight the applicability of the recommendation to adults as well as to children. *See p13-14 of the full response for details.* The recommendations for Dietary Reference Values for sugars outlined in Paragraph 11.13 are clearly based mainly on energy imbalance but a more appropriate interpretation of epidemiological data relating to the disease process of dental caries would have changed the emphasis of the report and led to a more stringent recommendation for free sugar intakes.	SACN thanked the respondent for their comments. The recommendations have been amended to reflect the fact that the conclusions on dental caries also apply to adults.
	Nestle	We support the fact that *"there is evidence showing that average intakes of free sugars should be below 10% of dietary energy".* We understand that the aim of SACN's recommendation for a target of 5% of total energy from free sugars in both adults and children is to help individuals reduce sugar intake to no more than 10%. The use of the word "around" in the sentence, *"dietary reference value for free sugars should be set at a population average of around 5% of dietary energy",* is important to be maintained because this recommendation is based on limited data. We recommend that this is highlighted in the final report to ensure that this point is maintained in any translation into Dietary Reference Values.	SACN thanked the respondent for their comments. We note the support for "around 5%" however SACN has amended the wording in light of consultation responses.

	Submitter	Comments	Action agreed by SACN
	Nutrition Society	Review of total sugars and sugar-sweetened beverage (SSB) obesity aspects: the SACN (and the Leeds reviewers) have conducted a very thorough detailed review that is commendable.	SACN thanked the respondent for their comments.
	Nutrition Society	SACN's report on Carbohydrate and Health represents the outcome of one of the most rigorous systematic reviews of the scientific literature to date. In July this year, the report came to the same conclusion as the World Health Organisation (March 2014), in recommending that the intake of free sugar should be reduced to no more than 5% of total energy. This conclusion was based on convincing evidence that the overconsumption of dietary free sugars contributes to weight gain, obesity, and dental caries, most noticeably in children. I welcome and endorse this recommendation from SACN, primarily because it will serve to help reduce obesity-related disease and co-morbidity. Moreover, from a nutritional perspective, because free sugar is non-essential in our diet and tends to be associated with energy-dense rather than nutrient-dense foods, the recommendation is very unlikely to have any adverse consequences for human health. It also has potentially greater health implications in protecting subgroups of the population who show increased sensitivity to the adverse metabolic effects of excessively high intakes of dietary sucrose and fructose (>20% total energy). These subgroups include children and teenagers over consuming sugar-rich foods (sugar sweetened beverages and confectionary), and overweight and obese adults with subclinical signs of cardio-metabolic risk and early liver disease.	SACN thanked the respondent for their comments.
	Nutrition Society	As an academic in Dental Public Health with an MSc in Public Health Nutrition, I am very pleased to see the current focus on free sugars. I wholeheartedly agree that the current population level of no more that 10% of energy is too high, and that it should be lowered to 5%, thus recommending that at the individual level the majority of the population	SACN thanked the respondent for their comments. SACN has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than a dietary

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		should be below 10%.	reference value.
	Nutrition Society	In Section 6, 6.61 and 6.62 on the frequency of sugar intake. It was not clear if this is actual sugar or sugar recorded in food. We do not normally eat sugar on its own so I was a bit puzzled by this.	SACN thank the respondent for their comments. SACN does not consider that the text highlighted by the respondent requires amending. The respondent is referred to the individual studies for more detail.
	Safefood	The lowering of the 'added sugar' average population target to 5% dietary energy highlights the growing evidence for the negative impact added sugar has on health. Given the current intakes of added sugar across the UK and Republic of Ireland populations this target in ambitious but an evidenced based target is important. Emphasis to health professional and general population needs to be placed on reducing the intakes of foods with low nutritional value such as table sugar, preserves, confectionary, biscuits, cakes, buns, pastries and breakfast cereals and in particular sugar sweetened beverages.	SACN thanked the respondent for their comments.
	Sugar Nutrition UK	Within the context of the recommendation of this draft Report that 50% of dietary energy should come from carbohydrates, reducing 'free sugars' from <10% to around 5% would result in starches, sugars within the cellular structure of foods and milk and milk products increasing from >40% to >45%. As these both contain 4kcal per gram, this would result in an isocaloric energy exchange rather than a decrease in caloric intake. Therefore this would not support the stated rationale of an obesity reduction objective. Furthermore, it has been shown that advice to reduce % energy from sugars frequently results in increases in the % energy coming from fat (Sadler et al., 2013). Therefore with fat providing 9kcal per gram, this may result in the unintended consequence of increased energy intakes, in direct conflict with the primary objective.	The evidence assessed by SACN investigated the effect of free sugars on total energy intake. From this, it was concluded that a higher sugars intake raises the risk of higher energy intakes. Therefore the higher the consumption of sugars, the more likely people are to exceed their estimated average requirement (EAR) for energy. It has been made clear in the report that if intakes of free sugars are lowered, the more likely it is that the EAR for energy will not be exceeded. Thus, total energy intake will be lower than if free sugars intake was

	Submitter	Comments	Action agreed by SACN
			higher.
	Professor Winkler	Dietary recommendations may be lowered - SACN recommends reducing the population DRV for free sugars to 5% of dietary energy. WHO, in its similar report on carbohydrates earlier this year, is considering the same reduction. Since then, Sheiham and James, using new information on lifelong oral disease in adults, have suggested a still lower target for sugar, 3% of total energy, even when fluoride is widely used[iii].	The conclusions reached by Sheiham and James are based on ecological data. The findings have been considered by SACN, but in view of the limitations of these data, they would not be used to set dietary recommendations.
Sugars-sweetened beverages	Action on Sugar	We feel the recommendation on the consumption of sugars-sweetened beverages should be stronger and it should state that sugars-sweetened beverages should not be given to children and should be generally avoided in adults. Sugar-sweetened beverages have minimal or no nutritional value and therefore should not be given to children at all.	SACN note the respondent's view, however there is no evidence in the report to suggest that sugars-sweetened beverages should be avoided. For this reason, the word minimised has been retained.
	ASO	ASO suggests that SACN consider strengthening the recommendations on sugar sweetened beverages (SSBs), given their contribution to daily intakes of free sugars, the strength of the evidence base and the significant opportunities for intervention. ASO is concerned that the current statement around 'minimising' SSBs is ambiguous. ASO would strongly support a recommendation that SSB should be avoided rather than minimised.	SACN note the respondent's view, however there is no evidence in the report to suggest that sugars-sweetened beverages should be avoided. For this reason, the word minimised has been retained.
	British Dental Association	We support the stated need to minimise consumption of sugar-containing beverages.	SACN thanked the respondent for their comments.
	British Dietetic Association	We welcome and support this public statement [on sugar-sweetened beverages] from SACN, which is simple and clear and one that public health policy can use to reduce availability.	SACN thanked the respondent for their comments.

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	Cardiff and Vale UHB	The recommendation on sugar-sweetened beverages could be enhanced to state: The consumption of sugar-sweetened beverages should be restricted in both children and adults and replaced by milk and water. Setting the DRV for free sugars to no more than 5% of total energy intake means that current mean intakes in all groups would be at least twice the DRV and three times the DRV in the 11-18 year age group. Removing sugar sweetened beverages from the diet (as these provided 30% of non-milk extrinsic sugar intake in the 11-18 year age group and 16% of intake in adults and young children) would contribute significantly towards meeting this target.	SACN thanked the respondent for their comments.
	Heart of Mersey (Food Active)	Food Active fully supports the recommendation that the consumption of sugar-sweetened beverages should be minimised in both children and adults. Reformulation and other proposed measures.	SACN thanked the respondent for their comments
	UCL Dental Public Health Group	The final bullet point on sugar sweetened beverages needs to be stronger. What does 'minimised' exactly mean? SSBs have no nutritional value and therefore should not be recommended. (See point 11.13 page 203).	SACN note the respondent's view, however there is no evidence in the report to suggest that sugars-sweetened beverages should be avoided. For this reason, the word minimised has been retained.
	UK Health Forum	UKHF welcomes the specific recommendation to reduce consumption of SSBs but we suggest that the current statement is strengthened, particularly in view of the impact of SSBs on children's health. We consider the evidence supports a recommendation that 'SSBs should not be given to children', and that the advice to adults is more specific – that consumption of SSBs should be 'generally avoided', rather than 'minimised'.	SACN note the respondent's view, however there is no evidence in the report to suggest that sugars-sweetened beverages should be avoided. For this reason, the word minimised has been retained.

	Submitter	Comments	Action agreed by SACN
	Which?	We agree that based on the available evidence, population 'free' sugar intakes should be lowered and that intakes of sugar sweetened soft beverages (SSBs) should be minimised.	SACN thanked the respondents for their comments.
Sugars-sweetened beverages criticism	Dr Alexander	There appears to be a disconnect between the level and evidence and the recommendations being made (in later sections) in the SACN report. Specifically, the totality of available scientific and epidemiologic evidence does not clearly support an independent relationship between SSB intake and energy, body composition parameters, or T2D. There have been some positive associations, effects, and correlations observed in the literature, however, because of significant methodological limitations and variability, the evidence base does not support the formulation of recommendations. Indeed, the associations between SSB intake and health outcomes are weak in magnitude, relatively inconsistent, based on rather sparse data, and are likely strongly confounded by other dietary and lifestyle factors. Thus, a cautious approach to interpreting the evidence should be made (*see full response under Chapter 6 synopsis for full details*). A critique of the cohort studies on sugar sweetened beverages and type 2 diabetes included in the SACN report and the Greenwood et al. 2014 systematic review is provided (*see full response under Epidemiology of Sugar-sweetened beverages and type 2 diabetes*). To note, Greenwood appropriately suggests that their results should be interpreted cautiously, and that there may be alternative explanations for the results, such as lifestyle factors or reverse causality. The conclusion of *association-moderate evidence* for sugars-sweetened beverages and type 2 diabetes is questioned in the response. See SSB and T2D analysis reported in the SACN report. To note: The exercise of performing a meta-analysis does not overcome the limitations of the individual studies. More specifically, results from a meta-analysis are only as valid as the validity of the individual studies	The authors of the Greenwood et al. 2014 paper are the same research group that conducted the cardiometabolic health review. An updated review on sugars-sweetened beverages and type 2 diabetes was conducted at SACN's request. With the inclusion of later studies it permitted an analysis to be conducted on those cohorts, which only investigated sugars-sweetened beverages. SACN considered the evidence provided and, despite the limitations, concluded that there was an association which has biological significance. In terms of the relative risk being weak in magnitude, the pooled estimate in Greenwood et al. 2014 is per 100ml of drink and an average measure is 330ml of which people tend to consume more than one serving. On this basis, the result is likely to be of public health relevance. SACN acknowledges that there is potential for biases in cohort studies and states this in the report. Criteria for including studies in the systematic reviews are set out clearly. SACN judged the evidence according to clear criteria and considered that there is evidence to show an

	Submitter	Comments	Action agreed by SACN
		included in a meta-analysis. The authors note methodological limitations in the studies, thus, a very careful and cautious interpretation is necessary. Judging of evidence needs to objectively and transparently include study quality, methods, and interpretation of results across the body of evidence – not merely a number of studies. It is not readily apparent in the SACN draft report whether/how this was performed. *The direction of the association indicates that greater consumption of sugars-sweetened beverages is detrimental to health*: It is true that a positive association was observed but again (emphasis added) – the association is very weak in magnitude, based on relatively few studies, and is likely influenced by bias and confounding. In the response the statement that the finding is *biologically relevant* is criticised because it lacks specificity and the reported association suffers from the limitations describe above. *See also full response (p.13) for points made under Dose response meta-analysis of SSB and T2D and Overview of the epidemiology of SSBs and T2D.*	association present between sugars-sweetened drinks and type 2 diabetes.
	British Soft Drinks Association	In view of the terms of reference of SACN which relate to "Dietary Carbohydrate" we are puzzled by the specific reference to SSBs, which are a food and beverage group and at odds with the approach adopted in relation to other carbohydrate groups including fibre. The consideration of the role of specific foods and beverages in disease risk does not form part of these terms of reference. We would therefore request that SACN reflects as to whether SSBs as a food and beverage group are outside the scope of the report, which does not appear, in other respects, to assess the impact of specific food and beverage groups on markers of health.	SACN has considered evidence on foods which are major contributors to carbohydrate in the diet, for example, potatoes, bread and breakfast cereals, as well as sugars-sweetened beverages. In terms of sugars-sweetened beverages, members judged there to be sufficient evidence on which to make a recommendation.

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	FDF	The fact that the evidence on sugars sweetened beverages and type 2 diabetes originally considered for the report was not combined into a meta-analysis and then the analysis by Greenwood et al. 2014 which cautioned against putting too much reliance on the pooled estimate was highlighted. *See full response for details (p7).* The level of credence given to this paper in the report's discussion seems high, given that the section previous (SACN draft report, chapter 6, section 6.32, p89) states a meta-analysis could not be completed. We recommend SACN clarify whether they consider a meta-analysis of the data points appropriate and on what basis. The robustness of the primary evidence base included in the Greenwood paper should also be specifically considered in the context of how it has informed the conclusions of SACN report on SSBs. For example, the Framingham Study combined artificially sweetened and SSBs into one category called 'soft drinks' (Dhingra *et al.,* 2007).	The authors of the Greenwood et al. 2014 paper are the same research group that conducted the cardiometabolic health review. An updated review on sugars-sweetened beverages and type 2 diabetes was conducted at SACN's request. With the inclusion of later studies it permitted an analysis to be conducted on those cohorts, which only investigated sugars-sweetened beverages. Therefore Dhingra et al. 2007 was not included in this updated analysis. The overall conclusion between sugar-sweetened beverages and type 2 diabetes mellitus is based on the results of the Greenwood et al 2014 paper. This has been made clearer in the final report. SACN considered the evidence provided and, despite the limitations, concluded that there was an association which has biological significance.
	Sugar Nutrition UK	There is insufficient evidence to support the individual recommendation of no more than 10% total energy and the population average 'free sugars' intake of around 5% dietary energy.	The calculations that were performed to inform the recommendation for sugars have been provided in the final report. These have been updated to include additional trials that were highlighted in the consultation.
Sugars sweetened	British Soft Drinks	The Draft Report's conclusion in relation to SSBs and Type 2 Diabetes Mellitus (T2D) appears to rest primarily on the highly heterogeneous data	The authors of the Greenwood et al. 2014 paper are the same research group that

	Submitter	Comments	Action agreed by SACN
beverages: criticism of evidence	Association	from one meta-analysis (conducted outside the systematic review) comprising of a limited number of studies of questionable relevance to the UK population. The inclusion of Greenwood et al 2014 and the exclusion of Montonen et al 2007 and Nettleton et al. 2009 from qualitative analysis are questioned. The heterogeneity of the data is highlighted (*see full response for further detail p3-4*). The reliance on epidemiology in describing the claimed association between SSBs and risk of T2D does not allow all confounding lifestyle factors to be taken fully into account, e.g., not all cohorts correct for body mass index (BMI) while obesity is a recognised risk factor for T2D. *A detailed analysis of potential confounding is provided in the full response on p4-5.* Despite acknowledging the "substantial" potential for confounding, which is born out in the data and in particular the fact that the association between SSBs and T2D diminishes following adjustment for known and suspected risk factors, the Draft Report appears not to follow its advice for caution given in Chap 4 [7], specifically to "Please interpret observational data with caution: With observational studies there is substantial potential for biases." The Draft Report says, "An association is indicated between greater sugar-sweetened beverage consumption and higher incidence of type 2 diabetes mellitus (RR 1.07, (95% CI 1.05, 1.08) for each 100ml/day increase, with a heterogeneity I2 = 65 [8]". We would suggest that this conclusion does not reflect the detailed analysis reported in Chap 4 [7], but perhaps reflects undue emphasis on the results of a single meta-analysis not conducted by SACN, where the limitations of the underlying studies and analysis have not been taken fully into account. It is suggested that this draft conclusion cannot be said to be a true reflection of the totality of the data. The significance to public health of an increased RR of 0.07 is likely to be inconsequential	conducted the cardiometabolic health review. An updated review on sugars-sweetened beverages and type 2 diabetes was conducted at SACN's request. With the inclusion of later studies it permitted an analysis to be conducted on those cohorts, which only investigated sugars-sweetened beverages. SACN considered the evidence provided and, despite the limitations, concluded that there was an association which has biological significance. BMI is on the causal pathway for type 2 diabetes. Any link between food or drink and type 2 diabetes, irrespective of the pathway, is of public health importance. SACN acknowledges that there is potential for biases in cohort studies but considers there is evidence to show an association present between sugars-sweetened drinks and type 2 diabetes. The pooled estimate is per 100ml of drink and an average measure is 330ml, of which people tend to consume more than one serving. On this basis, SACN considers the result is likely to be of public health relevance.

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		particularly where the meta-analysis is based on 10 or fewer trials as there is less power to detect bias and false positive results can be generated [20]. *See full response for further details (p5-6)*. We suggest that consideration is given to the following conclusion which more accurately reflects the totality of the evidence base: Sugar sweetened beverages and type II diabetes **No** association Limited evidence The Draft Report concludes existence of a linear relationship between sugars intake and energy intake and hypothesises a relationship between higher energy intake and higher bodyweight for which substantiating evidence is not provided. The scientific evidence presented on SSB intake, bodyweight and BMI in the Draft Report appears inconsistent and it is unclear how this provides a sound basis for a general total population recommendation to minimise SSB consumption. *See full response p7-8 for full critique*. Some of the details have been provided below: The Draft Report concludes that diets higher in sugars are likely to be higher in energy and infers that higher sugars consumption is therefore detrimental to health. However, whilst body weight and BMI measures are available in most of the studies comprising the evidence base, this objective measure of 'health' is not evaluated. Whilst many of these studies are not of sufficient duration to give an accurate, confident reflection of a longer impact on weight gain, in the majority of cases body weight fell from baseline, regardless of the contribution of sugars to total energy intake. We propose that short term energy intake is not a reliable proxy for long term weight gain. A critique of the RCTs on sugars sweetened beverages and BMI children is provided (p7-8). We would ask SACN to reflect on the judgment of the evidence base in this section, both its consistency with respect to the	Thank you for the proposed conclusion, however SACN continues to uphold its conclusion of association-adequate evidence. The calculations that were performed to inform the sugars recommendation has been provided in the final report together with a full explanation for the basis for the recommendation. These have been updated to include additional trials highlighted in the consultation and confirm the relationship between sugars consumption and energy intake. SACN has checked the de Ruyter et al. 2012 paper, including the supplementary material and cannot identify information on an intention to treat analysis or any result of this nature which gives a p= 0.06. Notably de Ruyter et al make it clear their primary analysis was not intention to treat because they were focused on testing efficacy not effectiveness. It would be consistent for SACN to also follow this logic, given that the one year data from Ebbeling et al. 2012 was explicitly used in the report (rather than their 2 year 'primary outcome' data) for similar reasons.

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		effect of SSBs on BMI and also on the adequacy of the available data. In Chap 11, 11.8 [3] there is confusion between SSBs **reduction** and addition “RCT’s conducted in children and adolescents indicate that consumption of SSBs as compared with non-calorically sweetened beverages resulted in weight gain”. It would be more accurately stated: *consumption of non-calorically sweetened beverages in place of SSBs resulted in reduced weight gain*. We would ask that SACN consider whether the totality of the scientific evidence presented on SSBs, bodyweight and BMI does, in fact, provide scientific substantiation for an association. This consideration, along with the lack of evidence linking the consumption of SSBs to cardiometabolic risk (Chap 12 12.10 or colorectal cancer (Chap 6 6.5) [3] questions the basis for the resulting population recommendation, in both adults and young people, to “minimise sugar-sweetened beverage consumption. The Draft Report recommends consumption of SSB be minimised in **both children and adults** despite identifying that there is no association between SSBs and cardiometabolic health, glycaemia or colorectal cancer and recognising the role of such confounding factors such as oral hygiene and global preventative measures in respect to oral health. In addition, associations between SSBs and T2D are weak and speculative, thus the totality of evidence presented would not appear to align with the conclusion in Chap12 p212 [3]. In Chap 11, 11.8 [3] there is confusion between SSBs **reduction** and addition “RCT’s conducted in children and adolescents indicate that consumption of SSBs as compared with non-calorically sweetened beverages resulted in weight gain”. It would be more accurately stated: *consumption of non-calorically sweetened beverages in place of SSBs resulted in reduced weight gain*. In reviewing the totality of the available evidence, it is apparent that the interpretation of the scientific evidence from a number of Expert Reports is at variance with the conclusions in the Draft Report. Scientific	Although the evidence is from RCTs in children, there is no reason to assume that excess calories provided by sugars sweetened drinks would not result in increased BMI in adults. SACN agrees that there is nothing specific about the effect of sugar when energy intake is held constant, apart from where dental caries is concerned. The wording relating to sugars-sweetened

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		Authorities suggest that sugars (free or otherwise) do not have a unique effect on body weight beyond its contribution to calorie intake (WHO, 2004 [21]; EFSA, 2010 [22]; and IOM, 2005 [23]).	and non-calorically sweetened beverages and weight gain in children and adolescents has been amended in the final report.
	Professors James & Sheiham	5% of energy as free sugars is a high value for individuals and is unsuitable as a population goal. The evidence just presented is strong evidence for considering 5%E from free sugars as the maximum levels for the long term exposure of individuals. The average sugar population intake should clearly be as low as possible with even a 2-3 % free sugar intake. *See full response p16 for further details*. A 5% value (equivalent to <10kg/yr as shown in Figure 2) in a non-fluoridated country leads to almost a 9 fold increase in caries rates and such a high percentage sugars figure can only be justified in a fluoride water treated country where tooth brushing with fluoride is also routine. This clearly does not apply to England. Therefore, this major public health point needs to be made in the final SACN document. A 10% sugar value for individuals is near sugar saturation levels for inducing a maximum dental caries burden. Because SACN concentrated so much on clinical trials and cohort studies, the point that 10% sugar value is near sugar saturation levels for maximum dental caries burden seems to have been overlooked. *See p17 of full response for further detail*.	SACN has clarified its dietary recommendation that the population average intake should not exceed 5% of total energy. The proposal that population sugar intakes should be 2-3% of energy is based on ecological data. The evidence has been considered by SACN but, in view of the limitations of these data, they would not be used to set dietary recommendations.
	Nutrition Society	Two recent and key RCT on children provide interesting new data but the conclusion in the summary report is overstated. The RCT de Ruyter et al (2012) is well conducted and is a valid comparison and points towards a potential role of SSB in the diet. The study by Ebbeling et al (2012) is similarly quite a good study; its primary objective was intended to reduce sugar intake from SSBs (intervention group) but is somewhat flawed because the control group	The rationale of SACN's recommendation to lower the consumption of free sugars is to reduce total energy intakes rather than to promote substitution. This point has been made more explicit in the report.

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		had no intervention other than being recruited to the study and told to continue as normal. The conclusion of the section on page 96 is as follows: The overall conclusions (para 11.8 page 200 and elsewhere) use strong language compared with the assessment of the evidence (my emphasis): 'Randomised controlled trials conducted in children and adolescents indicate that consumption of sugars-sweetened beverages, as compared with non-calorically sweetened beverages, resulted in weight gain and an increase in body mass index. ' Current dietary advice universally cautions the use of SSBs. This is appropriate advice for many people – but SSBs are not unique in their potential to lead to inappropriate energy intakes. They are probably uniquely 'more studied' at present but this should not lead to too much focus on one product rather than on the whole diet. In addition, focusing on one macronutrient may lead to unintended consequences. For example, in habitual self-selected diets where a sugar-fat seesaw is usually evident (Sadler et al 2013). (See also Markey and Lovegrove abstract 122 from Glasgow showing the effect of sugar reformulation)	
	Sig-Nurture Ltd	My personal view is that the evidence presented does not provide support for a general recommendation for all ages to minimise SSB consumption, though it may be appropriate for those who are overweight to limit their consumption or switch to lower calorie alternatives. *See full response for critique of evidence (point6).* Chapter 11 (DRVs) focuses on the one class of studies that found a significant result for SSB (SSB/RCT/children). This finding is based on 2 new trials, of which 1 (De Ruyter et al. 2012) was considered of sufficient standard to warrant upgrading the judgment from inconclusive to effect based on limited evidence (para 6.58 p 96). It could be argued that this is an insufficient basis on which to change a policy.	SACN acknowledges that there is potential for biases and confounding in cohort studies. SACN considered the evidence provided and, despite the limitations, concluded that there was an association which has biological significance.

	Submitter	Comments	Action agreed by SACN
		The RCTs on children are noteworthy in using more realistic amounts of SSB substituted with low calorie beverages. In para 11.8 the summary confuses SSB reduction and addition "RCT in children and adolescents indicate that consumption of SSB… resulted in weight gain". It would be more accurate to say *consumption of non-calorically sweetened beverages in place of SSB resulted in reduced weight gain*. • The conclusion relating to SSB and Type 2 Diabetes (cohort/ adults) "Association – moderate evidence" is surprising in view of the larger number of studies finding no effect, or no association, for sugars and any type of glycaemia or related health outcome (6.20-6.31). This suggests that further research may be required to evaluate the totality of the evidence and examine biological plausibility before finalising this judgment. • The evidence presented is the meta-analysis of cohort studies by Greenwood et al. 2014. The effect size is modest at best (1.07 per 100ml, or 1.23 based on 330ml/d) and prone to sources of bias and confounding by other dietary and lifestyle factors. • Heterogeneity was moderately high and the authors of the paper caution against placing too much reliance on the pooled estimate. Where this degree of heterogeneity is present, conclusions cannot be generalised. • The positive but weaker LCS result (RR 1.13) suggests that the result for SSB is not directly attributable to sugar content.	The wording relating to sugars sweetened and non-calorically sweetened beverages and weight gain in children and adolescents has been amended in the final report. The pooled estimate is per 100ml of drink and an average measure is 330ml of which people tend to consume more than one serving. On this basis the result is likely to be of public health relevance.
	Sugar Nutrition UK	Comments in relation to sugars-sweetened beverages and their risk to incidence of type 2 diabetes mellitus are not supported by the weight of scientific evidence. *A detailed critique of the evidence base has been provided on p 17 of the full response.* In Chapter 12 of the draft Report (p 210), there is clear	SACN acknowledges that there is potential for biases and confounding in cohort studies. SACN considered the evidence provided and, despite the limitations, concluded that there was an association

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		acknowledgement of the limitations and potential for bias in observational studies, stating that 'any associations must be interpreted with caution' (paragraph 12.3). Although many of the studies did adjust for multiple factors and performed sensitivity analyses, it is not possible to rule out residual confounding. These include variation in lifestyle patterns including, for example, that high consumers of sugars-sweetened beverages are more likely to smoke, be sedentary and have higher energy intakes (Schultz *et al.,* 2004). Taking this into consideration, we seek clarification that these factors were adequately controlled for. Any study that was included within the final analysis, but failed to adjust for these factors, should be interpreted with caution. The data presented on sugars-sweetened beverages consists of observational data. The Report fails to address the question of whether prior to making a public health recommendation to minimise one food group from the diet, the existing observational data (which has recognised limitations) should be supported by robust scientific clinical trials and intervention studies. This is particularly important given the cautious tone of the meta-analysis (Greenwood *et al.,* 2014).	which is of biological significance. It is unlikely that RCTs investigating sugars-sweetened beverage consumption and type 2 diabetes would be funded. Therefore, conclusions have to be drawn on the best available evidence.
Sugars DRV support	British Association for the Study of Community Dentistry	We support the recommendation that the population-wide reference value for free sugars should be 5% of total energy intake.	SACN thanked the respondent for their comments.
	British Dental Association	We support the recommended population-wide reduction of sugar consumption to five per cent of total energy intake.	SACN thanked the respondent for their comments.
	Cardiff and Vale UHB	Based on the above evidence and that considered by the WHO draft guideline for sugars intake for adults and children (WHO 2014), I agree with the following recommendations that the SACN make: The Dietary Reference Value (DRV) for free sugars should be set at a	SACN thanked the respondent for their comments.

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		population average of around 5% of dietary energy from 2 years of age.	
	Director of Public Health for Knowsley Metropolitan Borough Council	I welcome the bold and ambitious recommendations which include guidance to reduce free sugar intake to 5% of total calories per day, in line with WHO recommendation on sugars.	SACN thanked the respondent for their comments.
	Heart of Mersey (Food Active)	Food Active welcome the bold and ambitious recommendations which include guidance to reduce free sugar intake to 5% of total calories per day, in line with WHO recommendation on sugars. If an average woman were to consume only 5% of her daily energy (based on 2,000 calories) from free sugars, then this would equate to 5-6 teaspoons of table sugar which is far less than the amount of sugar contained in a standard 300ml serving of sugar-sweetened beverage.	SACN thanked the respondent for their comments.
	Professors James & Sheiham	The SACN compilation of the different trials of sugar intake and its relationship to weight gain (Figure 1 on page 202) is very commendable in allowing the reader to gain a perspective on the impact of sugar intakes. Certainly there seems to be no threshold in the effects of sugar intakes on weight gain so this alone would justify specifying as low a sugar intake as possible when the disease burden induced by excess weight in England is so enormous.	SACN thanked the respondent for their comments.
	Dr Madden & Dr Vafeiadou	We support the recommendation that an average of 5% of energy should come from free sugars in the population on the basis of the evidence included in the report. However, in view of current intake, we also recognise the challenge that this presents to consumers, the food industry and health professionals who will play a role in trying to implement the guidance.	SACN thanked the respondent for their comments.

	Submitter	Comments	Action agreed by SACN
	Dr Robinson	I agree that the nation should be advised to cut down to less than 5% the sugars found in soft drinks and cakes, chocolate, biscuits and sweets.	SACN thanked the respondent for their comments.
	Professor Rugg-Gunn	I agree with the Recommendations (Paragraphs 12.24 to 12.33) that total carbohydrate should be maintained at about 50%E and that the DRV for free sugars should be set at 5%E. This will benefit oral health considerably: the resultant increase in starch intake is not a threat to oral health. I would point out that the widespread use of fluoride-containing toothpastes has resulted in major improvements in oral health. However, use of fluoride toothpastes and reduction in sugars consumption are not alternatives -- both are needed if oral health is to be improved.	SACN thanked the respondent for their comments.
	UCL Dental Public Health Group	We welcome the recommendations on reducing the frequency and amount of free sugars consumption and the population DRV of 5% of total energy from free sugars. It is very important that the 5% population value is communicated more clearly as the maximum upper limit, and not as a target to aim for.	SACN thanked the respondent for their comments. The text around the 5% recommendation has been amended.
	Which?	We agree that based on the available evidence population 'free' sugar intakes should be lowered.	SACN thanked the respondent for their comments.
Sugar DRV criticism	Action on Sugar	**Individual's intakes:** We disagree with the recommendation for free sugars to provide **'no more than 10%'** of dietary energy for individuals. We suggest a more reasonable recommendation would be that free sugars should provide **'less than 5%'** for individuals, in line with the recommended population. **Population-average intakes:** We think the population average free sugars intake should be '**less than'** 5% of dietary energy and not '**no more than'** 5%, particularly when considering the evidence behind the importance of reducing dental caries on a population level, and the current high free sugar intake levels.	SACN has noted the respondent's view and on balance decided to provide a single population value for sugars to avoid confusion. It has been referred to as a dietary recommendation instead of a dietary reference value. It is proposed that the population average consumption of free sugars should not exceed 5% of total energy intake.

	Submitter	Comments	Action agreed by SACN
	Dr Alexander	It is indicated that these propositions have been made in the context of an energy intake appropriate to maintain a healthy weight. However, these recommendations are either 1) not clearly supported by the underlying evidence, or 2) completely lack evidence for some recommendations. *See full response under SACN Chapter 11 - Dietary Reference Values (p.14)* for details. In summary: Few studies with inconsistent methodology and variability/limitations in terms of the study population, sample sizes (all are relatively small), differing follow-up periods of rather short durations, and assessment of other factors that may influence energy intake are being relied upon to formulate recommendations. There are no (or sparse) data points relating sugar intake at 5% of energy intake. • There is no scientific rationale to isolate sugars in terms of a reduction to achieve a 100kcal dairy deficit. The authors of the SACN report did not do a formal analysis of other relevant sources of energy in this context, such as fat or alcohol. Thus, the SACN report provides no reliable basis to compare potential human health implications resulting from dietary modifications. • The singling out of SSBs is unwarranted and not supported by the available evidence. • The SACN authors themselves point out serious limitations and suggest a cautious approach to interpreting the evidence. Thus, if such limitations are acknowledged and a cautious approach is recommended, then based on sound scientific rationale, recommendations should not be made at this time.	The calculations that were performed to inform the sugars recommendation have been provided in the final report together with a full explanation for the basis for the recommendation. These have been updated to include additional trials highlighted in the consultation; these confirm the relationship between sugars consumption and energy intake. SACN has agreed to present this data in a different way to figure 1 in chapter 11. This helps to better illustrate the relationship between sugar and energy intake. SACN did not intend for the whole 100kcal reduction in energy to come from sugars but note that this was not clear in the draft report. It has been clarified that decreasing sugars intake provides one method for calorie reduction. SACN acknowledges that there is potential for biases in cohort studies and states this in the report. However, there is evidence to show that there is an association present between sugars-sweetened drinks and type 2 diabetes.
	Professor Brand-Miller	In my view, the draft guideline to reduce the UK population target intake of added sugar from 10% to 5% energy (E) is a large-scale experiment	The rationale of SACN's recommendation to lower the consumption of free sugars is

	Submitter	Comments	Action agreed by SACN
		that may have unintended consequences. No trial has been performed to determine the benefit, safety and efficacy of this major change in diet. There is the possibility of harm. (*See full response for details*).	to reduce total energy intakes rather than promote substitution. It was not SACN's intention for all of the energy reduction to come from sugars but it offers one method to lowering overall population energy intakes. These above points have been made more explicit in the report.
	British Dietetic Association	The rationale supporting change from free sugars intake target from (current position of) 10%E to 5%E is weak i.e. latter sections of para 11.10. Evidence presented in Fig 1 (page 202) does not clearly demonstrate reasons for proposed halving of target from 10%E to 5%E. Specifically one of the studies presented (Raben, 2002 – **NOT** 2001 as set out in Fig 1), is a small study (n=20), short-term (10 weeks), where subjects, unsurprisingly gain weight, when given diet supplement of sucrose at levels of 150g/d (nearly 30%E). This is about four times the current intake in the UK diet. Is this study appropriate for inclusion in data for a population-based diet recommendation, especially as Raben, 2002, is the only study in Fig 1 page 202 showing data on free sugars intakes at below 10%E?	The calculations that were performed to inform the sugars recommendation have been provided in the final report together with a full explanation for the basis for the recommendation. These have been updated to include additional trials highlighted in the consultation; these confirm the relationship between sugars consumption and energy intake. SACN notes the error in Figure 1 in the draft report and has amended the new figure to include Raben et al. 2002. SACN acknowledges the study design issues of Raben et al. 2002; however the results of this study are in line with other studies where participants are consuming lower quantities of sugar. Therefore, Raben et al. 2002 continues to form part of the evidence base.
	Grocery Manufacturers	There is insufficient scientific justification for recommending that the intake of free sugars be under 10% of total energy. The potential consequence of sugar intake below 5% of energy intake was not	It is noted that the issues raised regarding dietary adequacy are based on cross sectional data. SACN does not

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	Association	addressed in the report. The available evidence on intake of "added sugars" at 5% or less of energy suggests dietary inadequacy of several nutrients when sugar intake is at this low intake level. The Institute of Medicine (IOM) illustrated the shortfall intakes of calcium, vitamin A and iron in population groups in the US when added sugar intake was 5% or less of total energy intake (response for details of NHANES data provided).	recommend a diet that the populations in NHANES are following. The report advises on dietary patterns to help people achieve SACN's recommended intakes of free sugars and dietary fibre.
	Nutrition Society	The evidence for a 5% energy intake (EI) population value is weak and based on two assumptions that have not been evidenced in the SACN report; (1)That a proportion of people eat no added sugars thus requiring a population target of 5% EI in order to achieve Individual maximum targets of 10% EI; (2) that a 5% population added sugar intake would drive calorie reduction. The latter is based on a graph which correlates EI with % EI from added sugar. The first assumption should be evidenced with an analysis of the NDNS which properly models the required population target to achieve individual maximum targets of 10% EI added sugars. This could easily be done and it may be that the answer is higher, or even lower, than 5%. The second assumption should be evidenced with results from RCT which have lowered sugar consumption and examined the resulting calorie reduction. Again, this can be done. At present, I feel that SACN have simply tried to match the evidence to the WHO 5% EI target rather than letting the evidence drive the UK target.	Issues of consumer messaging and unintended consequences are risk management and beyond SACN's remit. The respondent's comments are noted. More explanation on how the 5% figure was derived has been provided in the report. In addition, the data has been presented differently so that it does not appear misleading. Further studies, which were highlighted in the consultation, have also been included. SACN has considered this issue and decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than dietary reference value.
	Nutrition Society	The scientific review seems thorough and far-reaching. A wide set of literature has been reviewed with a corresponding wide spectrum of outcomes (incident disease endpoints, biomarker endpoints and dietary effects). Much of the evidence reviewed was deemed as scientifically insufficient or conflicting. In particular the sugars target is based on limited effects on disease risk.	The risk management/public health policy aspects of this topic are beyond the remit of the SACN report. The issue of individual responsibility will be important in this context, but the evidence presented in the report on the relationship between %energy from sugars and total energy

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		The free sugars energy target is founded on reduction in risk of dental caries, and the dietary collinearity between sugars intake and energy intake. I would contend that setting targets on the latter relationship might be problematic in a public health context. The inference in the report is that a population reduction in sugars intake will help achieve reduction in energy intake. This emphasis on changing diet composition to effect lower energy intake is against a backdrop of no clear public health message about individual responsibility to harness overconsumption (reduce total intake of energy) and preventing obesity. In fact confusingly SACN increased energy intake requirements in 2012. Changes in food choice to limit dietary sugars intake may not be a magic bullet to curb overconsumption, and in fact the report confusingly advises that the sugars energy deficit should be made up from starchy foods and sugars from milk and milk products (12.26). Equally advice in relation to changing other macronutrient components (starch or fibre) without emphasis on total energy seems ill-founded.	intake is such that a reduction in the former is likely to reduce passive overconsumption of energy and lead to a fall in total energy intake. The report says that 50% of energy intake (which is likely to be a lower total if %energy from sugars is lower) should be from carbohydrate, with at most 5% of the total energy intake from free sugars. The SACN energy recommendations were linked to an evidence-based physical activity level and the recommendations related to a healthy BMI so for more than 50% of the population this would represent a decrease in energy intake compared to their actual intake.
	Nutrition Society	• The overall data on sugars and SSB and body weight are surprisingly limited and inconclusive. • The conclusions of the report, as drafted, overstate this evidence. These data do not support a change in the population target. • I have not reviewed the data on energy intake – but this is an intermediate endpoint in terms of body weight changes. If these data were used to seek approval for a health claim, for example, it would not be acceptable. • The data on energy intake vs. % energy from sugar do not support a change in population target.	In terms of sugars-sweetened beverages, SACN considered the evidence provided and, despite the limitations, concluded that there was an association which has biological significance. The calculations that were performed to inform the sugars recommendation have been provided in the final report together with a full explanation for the basis for the recommendation. These have been updated to include additional trials highlighted in the consultation and continue to confirm the relationship between sugars consumption and energy intake.

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	Nutrition Society	Using Figure 1.1 (page 201-2) to justify setting a 5% target for free sugars raises a number of issues. I am assuming that the studies looked at *ad libitum* energy intake and were carried out for a reasonable length of time in diverse populations, though these points need to be made clear. Most importantly, do the studies report total sugars or free sugars? The exact category of sugars needs to be clearly stated on the x-axis label. If the studies use total sugars and free sugars are perhaps 60% of total sugars then the range of intakes becomes more representative of UK diets but there would be even less evidence for a steeper relationship between sugars intake and energy intake at lower sugars intake, as suggested in para 11.10. Second, to achieve a reduction of 100 kcal/day by reducing sugars intake by 4% energy would represent a reduction from the current values of 11-15% (according to age) to 7-11% not 5%: in older children reducing from 15% to 5% energy would lead to a reduction of approx. 250 kcal/d by these extrapolations which could be considered too great a reduction for health. Third, if individual intakes should be no higher than 10%, would the population average necessarily be 5% (i.e. around half of the population having less than 5%), or might it be closer to 7 or 8% with a narrower and possibly more skewed distribution than at present?	The respondent's comments are noted. More explanation on how the 5% figure was derived has been provided in the report. In addition, the data has been presented differently so that it does not appear misleading. Further studies, which were highlighted in the consultation, have also been included. SACN has considered this issue and decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than dietary reference value.
	Sig-Nurture Ltd	The new quantitative recommendation for free sugars at 5% of total energy is insecure. There is a Lack of evidence supporting 5% as optimum level of free sugars • The scientific data mainly relate to the adverse effects of very high sugar diets on excess energy intake, which cannot be extrapolated to imply that very low sugar diets necessarily reduce energy intake over the long term. • There is insufficient support for benefit at 5% energy from sugars. As acknowledged in the report (para 11.10) "*there are few data at this level of intake to draw firm conclusions".* In fact there is only one intervention in the meta-analysis which used intakes at this level,	SACN has considered this issue and has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than dietary reference value. The calculations that were performed to inform the sugars recommendation have been provided in the final report together with a full explanation for the basis for the

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		(Raben, 2002) and this is quotes a *sucrose* intake of 4.4% (Raben 2002), which underestimates free sugars intake significantly. • Most sugar restriction studies used 8-9% sugars in the low sugar group (Drummond 1998, Drummond 2003, Byrnes 2003) suggesting this is the lowest than can be achieved practically without compromising balance and variety. In addition, there are no developed nations with sugars intakes as low as 5% in modern times. • A 5% sugars energy DRV gives undue emphasis to reducing everyone's sugar intake, which is not scientifically well founded and may have unintended consequences. It would be helpful to show the distribution of free sugars intake (estimated from NDNS) and the modeling assumptions used in arriving at the 5% mean. • Having two targets (<10% and 5%) will confuse consumers.	recommendations. These have been updated to include additional trials highlighted in the consultation and continue to confirm the relationship between sugars consumption and energy intake.
	Unilever	We acknowledge that the evidence derived from multiple adverse outcomes, and that there is quantitative justification for populations to consume <10% energy, based on oral health and energy intake outcomes. However, the evidence and textual context points mainly to evidence for a 10% energy recommended maximum intake of individuals (para 11.10), whereas the basis for setting a specific ≈5% DRV for populations is less clear. The latter is largely taken as a statistical correlate of the former, with limited independent quantitative underpinning. We therefore recommend that SACN sets one recommendation, i.e. a 10% 'upper intake/maximum' level for individuals. We acknowledge that this approach sets a precedent for SACN; however this recommendation in turn removes the potential confusion in 'dual' targets (population and individuals). Further, it allows for a clear differentiation between DRVs for essential nutrients versus guidance on dietary components such as sugars. In addition, a 10% individual maximum implies a population	SACN has considered this issue and has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than dietary reference value. The following wording has been provided: the population average free sugars consumption should not exceed 5% of total energy intake. The calculations that were performed to inform the sugars dietary reference value have been provided in the final report together with a full explanation for the basis for the recommendations. These have been updated to include additional trials highlighted in the consultation and

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		mean of <<10% [probably around 5-6%], thus reflecting SACN's desired population public health goal. This is without requiring any assumptions regarding shape of the relationships (linear or not) between individual limits and population mean. Thus, the 10% individual limit is scientifically justified, and provides a clear and feasible target for communication, benchmarking and monitoring. Should SACN retain the 5% energy population DRV, further clarification and transparency within the report on the assumptions made to derive this specific value would be appreciated. Also the illustration of the modelling conducted to ascertain if this recommendation is indeed a realistic outcome from the 10% individual maximum.	confirm the relationship between sugars consumption and energy intake.
Individual vs. population DRV	BNF	The current target for NMES is a population target (11% dietary energy excluding energy from alcohol (10% total energy)); there is no target for individuals. The wording on pages 203 and 216 suggests that the decision was taken by SACN to first identify an upper limit for individuals and then to identify the population target that would achieve this (… *'This is based on the need to limit free sugars to no more than 10% of total energy intake at an individual level, which is likely to lead to a population average free sugars intake of around 5% of total energy.*'). We note that this appears to be a departure from the previous approach of setting only population-based targets for macronutrients and discussion of this change in approach is needed. Discussion of the move from a population target of 10% of total energy to an upper limit of 10% for individuals would also be helpful to readers as background. Furthermore, a commentary on how the two reference values will be used in tandem would be helpful in avoiding further confusion or speculation.	SACN has considered this issue and has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than a dietary reference value. The following wording has been provided: the population average free sugars consumption should not exceed 5% of total energy intake.
	BRC	Mathematically a population consumption of 5% cannot be achieved with a maximum individual consumption of 10%. Is the suggestion that the policy recommendation refers to a maximum consumption of 5% to realistically achieve a maximum individual consumption of 10%?	SACN has considered this issue and has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than dietary reference value. The following

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		We believe this section should be redrafted in a clearer manner, indicating the association between the individual versus the population recommended value.	wording has been provided: the population average free sugars consumption should not exceed 5% of total energy intake.
	FDF	Alongside our reasoning outlined above we believe that having both individual and population targets is confusing and we are unclear as to the purpose of having two. Taking these factors into consideration, we would welcome SACN giving consideration to whether setting one target at 10 percent of total energy intake might be appropriate. The SACN discussion mainly relates to evidence for a 10 percent of total energy recommended maximum intake. By focusing on a single recommendation it removes the potential confusion in having two targets (population and individuals) and provides a clear and feasible target for communication, benchmarking and monitoring. *See full response for details p7*.	SACN has considered this issue and has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than dietary reference value. The following wording has been provided: the population average free sugars consumption should not exceed 5% of total energy intake.
	Nestle	We would welcome additional clarification regarding the differentiation between the recommendation on the need to limit free sugars to no more than 10% of total energy intake at an individual level alongside a population average recommendation of 5% of dietary energy and consideration how this might be translated into Dietary Reference Values.	SACN has considered this issue and has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than a dietary reference value. The following wording has been provided: the population average free sugars consumption should not exceed 5% of total energy intake.
	Nutrition Society	Secondly, the population average target for free sugars of 5% energy seems incongruent with an individual target of 10% energy. Are these two targets based on the current distribution of sugar energy in the population? Given current dietary patterns, behaviour change will have to be great to achieve such a stringent population target of 5% sugars	SACN has considered this issue and has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than a dietary reference value. The following wording has been provided: the population

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		energy.	average free sugars consumption should not exceed 5% of total energy intake.
	Nutrition Society	The population DRV for free sugars of 5% of energy makes sense as does the figure of no more than 10% of energy at an individual level. However this may still cause confusion given that the European RIs for Food Labels are in terms of total sugars. There needs to be some way of distinguishing reference intakes (as stated on food labels) that are minimum amounts e.g. dietary fibre and those that are maximum as in the case of sugars.	SACN has considered this issue and has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than a dietary reference value. The following wording has been provided: the population average free sugars consumption should not exceed 5% of total energy intake.
	Sig-Nurture Ltd	Having two targets (<10% and 5%) will confuse consumers. The report asserts that the existing <10% recommendation should now apply to individuals, not to the population mean. No scientific rationale is presented for this shift, which is contrary to the principles used in setting other UK DRVs. It is also inconsistent with the supporting data from RCTs, which gives group mean intakes. I am not aware of any reliable data to show that an intake of more than 10% energy from free sugars is harmful for individuals with an active lifestyle and normal body weight.	SACN has considered this issue and has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than a dietary reference value. The following wording has been provided: the population average free sugars consumption should not exceed 5% of total energy intake.
	UCL Dental Public Health Group	It is somewhat confusing however to specify different per cent energy for individuals (10%) and populations (5%). A clearer rationale for this point needs to be presented otherwise it will lead to confusion amongst both the general public and health professionals.	SACN has considered this issue and has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than dietary reference value. The following wording has been provided: the population average free sugars consumption should not exceed 5% of total energy intake.

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	UK Health Forum	UKHF agrees with the proposed revisions to dietary reference intakes – reducing the population average reference value for free sugars to 5% of dietary energy. However, we recommend that the individual average reference value should also be 5% (not 10%, as proposed). This would reduce the scope for confusion among professional groups and the general public in terms of the messaging required to support implementation. Current intakes are high in all age groups and significantly higher in low income groups compared to the general population.	SACN has considered this issue and has decided to provide a single value for populations. This has been referred to as a dietary recommendation rather than a dietary reference value. The following wording has been provided: the population average free sugars consumption should not exceed 5% of total energy intake.
Sugars and energy intake-criticism	Dr Alexander	The quality of the evidence for sugars and energy intake was questioned. *See full response for details (p5 energy intake and body composition).* In summary, Given these important concerns, the evidence should not be considered adequate and a conclusion of an 'effect' is not warranted based on the underlying data sources. Furthermore, their findings were not substantiated by all lines of evidence, i.e., data from cohort studies. In addition, for the cohort studies conducted among children, the SACN authors concluded no association between SSBs and increasing BMI, and no association between SSBs and increased body fatness (6.51-6.53, pg. 94, summary boxes). The authors reported an effect, with limited evidence, that SSBs increase BMI in the randomized controlled trials (pg. 96, summary box).	The calculations that were performed to inform the sugars dietary reference value have been provided in the final report together with a full explanation for the basis for the recommendations. These have been updated to include additional trials highlighted in the consultation and confirm the relationship between sugars consumption and energy intake. The reason for the lack of evidence on body weight and body mass outcomes is that a number of studies did not meet the minimum duration required to be included in the systematic review.
	BNF	We expected to find more discussion of the quality and generalisability of these RCTs in the draft report as particular emphasis has been given to them as the underpinning for the revised sugars recommendation, with little cross-referencing to the dental health evidence (particularly that relating to children's dental health) or indeed the other evidence reviewed by SACN in its comprehensive report. Given the ramifications of this particular recommendation, representing a major change from the	Due to the scale of the report it is not possible to include a detailed critique of individual studies. However, SACN have ensured that the evidence on sugar and dental caries is discussed in the report.

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		current population recommendation of 11% dietary energy (10% total energy), the SACN report could usefully include a more detailed discussion (perhaps in Chapter 11) of the individual studies that feature in the meta-analysis, reflecting the nuances in the SLR and the earlier chapters of the report. A detailed critique of the evidence is provided (*see full response for details*). So in conclusion, as the evidence from these studies on energy intake is used to support SACN's proposed changes in dietary recommendations for sugars and SACN's review concluded that there was insufficient evidence to draw conclusions on the impact of sugars intake on body weight from the available studies (Section 6.72), a more detailed discussion within the main report of the rationale for the recommendation made, based on the available evidence, should be considered. Also, there was a limited number of studies and all of the included studies were published more than 10 years ago and so there may be new material (published since SACN completed its review) that could be considered in an updated presentation of the data.	More recent studies on sugar consumption and energy intake highlighted in the consultation have been included in the final report.
	Dr Buyken	Aiming at 5% energy from added sugar as suggested by the SACN report (compared to 10% upper limit suggested by other international dietary guidelines) is not supported by the evidence. While it is plausible that a higher *ad libitum* sugar consumption leads to higher energy intakes, sugar *per se* does not appear to be causally linked to obesity because no association of isocaloric exchange of sugar against other carbohydrates and weight change could be established (Te Moregna 2013). A reduction of energy from free sugars, if not compensated, would seem appropriate among populations with undesirable levels of overweight and obesity; however this idea is not reflected in a public health message of 5% expressed as a percentage of energy (which does NOT encourage a reduction of overall energy intake).	SACN agrees that that there is nothing specific about the effect of sugar when energy intake is held constant, apart from where dental caries is concerned. The calculations that SACN performed to inform the sugars dietary reference value have been provided in the final report together with a full explanation for the basis for the recommendations. These have been updated to include additional trials highlighted in the consultation and confirm the relationship between sugars

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			consumption and energy intake
	Dr Drummond	As author of 4 papers included in the report, I would like to query the data selected from my papers listed 1 & 2 above, referred to in paragraph 6.18, 6.19 of the report and in Figure 1, page 202: '*The relationship in randomised controlled trials between daily energy intake and the percentage of total energy intake consumed as sugars'.* From both my papers you have selected the end point data from two independent groups for sugar intake and energy intake without taking into account differences in energy intake between these groups at baseline – which I think is significant particularly in the 2003 paper. From Reference 2 (2003 paper) Table 1 p83: Baseline 8Weeks EI (MJ/D) Group 1 9.70 9.39 Group 2 8.49 8.39 %NMES Group 1 10.0 10.5 Group 2 11.4 9.0 I think the way the data has been selected (by focussing on the endpoint data) is misleading. In fact, if you had selected the baseline values for Group 1 & 2 the relationship would have been the other way round – i.e. at Baseline: Group 1 NMES= 10.0% EI = 9.7MJ Group 2 NMES = 11.4% EI = 8.49MJ From Reference 1 (1998 paper) Table 5 p479 Baseline 6weeks 6months EI (kcal/d) Group 1 2566 2141 2253 Group 2 2639 2280 2455	SACN thanks the respondent for their comments. It is agreed that Figure 1 in the draft report appeared misleading and the data are now presented in a different manner.

	Submitter	Comments	Action agreed by SACN
		%total sugar Group 1 17.0 15.9 16.5 Group 2 16.5 19.9 19.6 Here you can see that as Group 2 increased %total sugar from 16.5 to 19.9 to 19.6%, their intakes decreased from 2639 to 2280 to 2455kcal/d. There was no significant change in %total sugar in Group 1. In addition, Group 2 significantly reduced EI whilst increasing %energy from sugar – particularly at 6 weeks, which lead to significant weight loss (2.5kg), which an important outcome since weight control is the key issue after all. (NB: the reduction in total energy intake was the result of reducing intakes of dietary fat) I also think it is misleading to connect the data points with a line on Figure 1. This makes it look like the 2 data points are from a single group repeated measures over time, whereas they are from two different groups at one single time point. I would be delighted if my studies continued to be included in this report but to acknowledge that there is no evidence from my studies that with increasing sugar intake there is an increase in energy.	
	FDF	The evidence of a linear relationship between percentage energy from sugars and energy intake - there are a limited number of data points on which to base these conclusions. Twelve data points have been plotted on figure 1. Three data points represent intakes higher than 97.5% of adults in the UK (NDNS, 2014), and so the relevance to free-living UK adults must be questioned. It is assumed there is a positive, direct cause and effect relationship between dietary sugars intake and total energy intake, as a linear relationship is demonstrated. However only two data points are plotted from each trial and extrapolating from this that a relationship is linear is inappropriate; a minimum of three data points is usually considered	SACN thanks the respondent for their comments. It is agreed that Figure 1 in the draft report appeared misleading and the data are now presented in a different manner. The calculations that were performed to inform the sugars dietary reference value have been provided in the final report together with a full explanation for the basis for the recommendations. These

	Submitter	Comments	Action agreed by SACN
		necessary to inform such a conclusion. Given this paucity of data, it is possible that sugars intake in the range being discussed may not be linear, but could be J- or U- shaped. This is given plausibility by data from Marriott *et al*., (2010), who examined the 2003-2006 National Health and Nutrition Examination Survey (NHANES) cross-sectional data. *See full response for details (4-5).* We would therefore ask SACN to either review its conclusion that the relationship between sugars intake and energy is linear or to provide a more robust justification. <u>The appropriateness of using a 100kcal reduction as the basis for proposing a DRV for free sugars in the context of an individual in energy balance</u> The modelling then considers the amount of energy from sugars which would need to be reduced from the diet to achieve a 100kcal reduction in energy intake. This results in a figure of 6 percent. Given the lack of data as acknowledged by SACN, and the uncertainty around the derivation of the figure, we would welcome clarification of the reasoning for lowering the calculated figure from 6 to 5 percent of energy intake. The original Expert Group paper clearly models a 24kcal reduction would prevent weight gain at the 90th percentile in an adult population, however the modelling work which underpins the 100kcal conclusion is not provided. We believe that the material on which these conclusions are based should form part of the SACN report and would expect any evidence used to underpin this conclusion to meet the same inclusion criteria that SACN has applied throughout this report. In the report it would be helpful if there was clarity on: • whether the final recommendation which reflects the 5 percent figure is derived on the basis of a need to reduce calories and includes a calorie reduction recommendation; ***or***	have been updated to include additional trials highlighted in the consultation; these confirm the relationship between sugars consumption and energy intake. SACN did not intend for the whole 100kcal reduction in energy to come from sugars but note that this was not clear in the draft report. The text has now been clarified to say that decreasing sugars intake provides one method for calorie reduction. The Expert Group advice is clearly referenced in the report. The calculations that were performed to inform the sugars dietary reference value have been provided in the final report together with a full explanation for the basis for the recommendations. These have been updated to include additional trials highlighted in the consultation and confirm the relationship between sugars

	Submitter	Comments	Action agreed by SACN
		• how the 5 per cent figure is derived, beyond modelling a calorie reduction. For example, if there is an assumption that a reduction of average intakes of free sugars to 5 percent of energy intakes will prevent over-consumption of energy in the diet the evidence and derivation of the 5 percent figure within that context should be included in the report. <u>Population modelling to understand if shifting the population average to 5% will lead to the stated aim of ensuring individual maximum intake is below 10%</u> *See full response for all details (p6).* Considering current data from the NDNS (NDNS, 2014), it would appear intakes of NMES are not normally distributed, rather there is a skew to the right hand side of the curve reflected by considering the mean, lower and upper 2.5 percentage of intakes (12.1%, 2.4% and 26.3% respectively of food energy). This would mean that to achieve a population average of 5 percent, the majority of consumers would actually need to be lower than this, which may not be feasible. If the data is not normally distributed then rather than shifting the curve, it may be more appropriate to consider targeting current consumers at the upper end of intakes to bring these down towards, or below the recommended maximum individual intake. We recommend SACN undertakes population modelling to provide underpinning to the consideration of an appropriate sugars DRV for the UK population.	consumption and energy intake
	FSAI	Chapters 11 and 12 setting DRVs for Carbohydrate and free sugars specifically should be amended to consider the effects on other macronutrients – especially total and saturated fat. This would be in line with the approach used by IOM which accounts for the fact that macronutrients are sources of energy that can be used interchangeably (see Institute of Medicine 2002 -2005). The approach outlined in the SACN Draft Carbohydrates and Health Report in paragraph 11.10 to formulate the 5% mean Free Sugars intake goal is flawed in that it only	The intention of SACN's recommendation to lower the consumption of free sugars is not to promote substitution but to reduce total energy intakes.

	Submitter	Comments	Action agreed by SACN
		considers energy and not the complex dietary inter-relationships between fat and sugar. Dietary intake studies in the UK and Ireland have consistently demonstrated the reciprocal relationship that exists between total fat (and saturated fat) and sugar intakes (see Flynn *et al* 1996 and Flynn & Kearney 1999 below). This is often referred to as the fat-sugar see-saw. We have explored this is in the detailed revision of Ireland food based dietary guidelines to protect against chronic diseases including obesity, and to improve health – including dental health (see Flynn *et al* 2011a, Flynn *et al* 2011b, FSAI 2011 and FSAI 2012 below). In an earlier study of dietary intakes in Ireland the inverse relationship between total fat and non-milk extrinsic sugars (NMES) sugars intake was found to extend to saturated fat (see Flynn *et al* 1996). Examination of the food sources of NMES sugars in this study categorised these foods into those that were 'fat-free high sugar foods' and 'fat-containing high sugar foods'. The 'fat-free high sugar foods' were found to be associated with lower fat and saturated fat intakes while the 'fat-containing high sugar foods' were not. Furthermore the low fat and low saturated fat diets that contained higher quantities of the 'fat-free high sugar foods' were associated with higher intakes of fibre and micronutrients with the exception of vitamin A (Flynn *et al* 1996). This demonstrates that 'fat-free high sugar foods' have a role - albeit in limited amounts, as part of a healthy diet.	
	Grocery Manufactures Association	The Draft Report concludes that as "free sugars intake is a dietary factor shown to increase energy intake, decreasing the population intake of free sugars is a step that could be taken to help reduce the current UK over-consumption of energy". The estimated daily energy reduction provided by the Calorie Reduction Expert Group and the associated calculation for the amount of energy reduced per 1% intake in free sugars implicitly assumes that the energy from sugars will not be replaced in the diet, or will only be replaced by foods with lower energy density. However, it is conceivable that substantial reductions in energy from sugars may lead to some compensation of intake of energy from	SACN acknowledges that the estimations assume no dietary compensation for the additional energy supplied in the higher sugar diets and this may not reflect true dietary behaviour; however, the trials suggest that there is inadequate compensation.

	Submitter	Comments	Action agreed by SACN
		other nutrients, for example, (saturated) fats or alcohol. GMA recommends SACN consult the compensation literature to examine the potential impact of the reduction of free sugar intake on overall energy intake. Additionally, there does not appear to be a linear relationship between BMI and intake of added sugars. In fact, a greater proportion of individuals classified as underweight and normal weight by BMI were reported to have higher levels of added sugars intakes than individuals classified as overweight or obese. In a recent meta-analysis of trials with dietary sugars and body weight, the researchers found increasing sugar intake was associated with weight increase, but the isoenergetic exchange of sugars for other carbohydrates had no statistically significant effect on body weight. Additional long term intervention studies should be conducted to ascertain that there are no negative effects on adequacy of nutrient intakes when free sugars intake is reduced, as well as, specifically measuring the effect of free sugar intake on obesity. The report indicates that two Randomized Control Trials (RCTs), Mazlan et al, 2006 and Volp et al. (2008) were not included in the analysis on diets differing in the proportion of sugars in relation to energy intake. GMA asks for clarification as to why these trials could not be included in the meta-analysis, particularly what necessary data was missing from the trials.	SACN agrees that there is nothing specific about the effect of sugar when energy intake is held constant, apart from where dental caries is concerned. The systematic review on energy intake, which forms part of the cardiometabolic health review, states that Mazlan et al. 2006 and Volp et al. 2008 could not be included in a meta-analysis because they did not present measures of variation. However, results from these 2 studies were largely in line with the other, included studies.
	Professors James & Sheiham	The SACN calculations suggest the need for a mere 100kcal average intake reduction to not only prevent weight gain but to induce a slight fall in body weight. This figure is based primarily on the assessment of the excess energy stored per day of 20-40 year old adults between 1999 and 2009, as set out in a very simple set of calculations made by the SACN Calorie Reduction Expert Group. However, one needs to consider the assumptions of both the SACN carbohydrate report and the Calorie Reduction Expert Group and realise that the 100kcalorie reduction is	The estimates made by the respondents are not correct. The Calorie Reduction Expert Group used the UK data on population BMI change to show that the average weight gain, assuming a normal composition of the gained weight, was equivalent to a daily positive energy balance of around 30kcal – somewhat

	Submitter	Comments	Action agreed by SACN
		only slightly greater than the estimated daily energy storage of young English adults gaining weight over a 10 year period. The calculations of the Calorie Expert Group make no allowance for the well-recognised increase in routine maintenance energy requirements on weight gain and make absolutely no allowance for adjusting energy intake to cope with the pre-existing major public health problem of overweight and obesity in England. So if one takes the data of the Health Survey for English males and females above 16 years, their average weights (when actually measured rather than self- reporting) were 83.9kg for men and 71kg for women. This means their respective average BMIs were 27.3 for men and 27.1 for women. It is obvious that to reduce the average BMI to 25.0 simply means that 50% of the population would still be overweight (BMI 25-29.9) or obese (BMI 30+). That is why one of us concluded for the WHO major Millennium analysis of the global burden of disease that the ideal average BMI should be 21 to minimise the proportion of those who were either underweight or overweight[11]. This would mean an average reduction in body weight to 64.5kg in men and 55kg in women. This is, of course, unrealistic in the near future but that is the counterfactual analysis which is still used by WHO albeit the latest non WHO global burden analysis from Seattle and Harvard allows an optimum BMI of 21-23. Even if one takes a BMI of 23 or the SACN Committee's Dietary Reference Energy Report[12] with the use of a BMI of 22.5 this would still mean a BMI reduction of over 4 units. This corresponds to an average desirable body weight reduction of 10kg -15kg. If one then takes the SACN values for dietary energy requirements with the Henry equations, seemingly favoured for their estimates of basal metabolic rate, and the physical activity levels of 1.62 from the D_2 0^{18} values quoted by the SACN report on dietary reference values for energy, then reducing the body weights of men and women to the so-called SACN desirable levels	lower than in the US as calculated by Hill and colleagues for a population with a higher annual mean weight gain. The value of 100kcal was recommended by the Calorie Reduction Expert Group to incorporate over 97% of the UK population and to not only prevent further weight gain but also achieve some weight reduction. These are population recommendations, such that if the whole population reduced energy intake by 100kcal /day then the population weight gain would be arrested. We thank the respondents for the other calculations but they contain a number of estimates and assumptions which are somewhat contentious, but more importantly they go beyond the remit of this carbohydrate report. The solution to population overconsumption of energy cannot be solved by targeting a single macronutrient, but requires changes in carbohydrates, fat and alcohol. The present report identifies a potential contribution to this goal by recommending an evidence based decrease in free sugars intake.

11 James WPT, Jackson L, Mhurchu CN,Kalamara E, Shayegi M et al: Overweight and obesity. In: Ezzati M, López AL, Rogers A, Murray CJL (eds.): Comparative quantification of health risks: global, regional, burden of disease attributable to selected major risk factors. Geneva, WHO, 2004;497-596,

12 The Scientific Advisory Committee on Nutrition report on the DRVs for energy. Department of Health 2011.

	Submitter	Comments	Action agreed by SACN
		of BMI 22.5 would require an average reduction of about 275kcals/d in 30-60 year old men and 150kcal/d in women. This does not include the 15 kcal - 40 kcal reduction to avoid current weight gain as calculated by the Calorie Reduction Expert Group. So the really desirable kcalorie reduction in an average adult in England amounts to about 300kcal/d for men and about 175kcal/d for women. The reductions needed for the majority of overweight and obesity individuals will be even greater e.g. 300 kcal -600kcal/d for men and perhaps 200kcal- 400kcal/d for women.	
	Sig- Nurture Ltd	An estimate of effect size of 28kcal per 1% sugars energy, presumably derived from a regression analysis on the RCTs, has been used to predict a 100kcal reduction in total energy intake if free sugars intake is reduced by 4%. However, this estimate does not represent the independent effect of sugars but reflects all the dietary differences between studies, including fibre content, energy density and palatability. The fact that this value (28kcal) is higher than the actual contribution of 1% energy for a reference adult woman or man (20kcal or 25kcal respectively) illustrates that other dietary factors are responsible. Compensation is not taken into account, yet supplementation studies (Raben 2002) (Reid 2007, 2010, 2014) showed that about half the energy supplement was compensated for by a reduced intake of other food or drink. No justification is given as to why the 100kcal desired energy deficit should be achieved solely by reducing sugars intake, rather than other macronutrients such as saturated fat or alcohol, which are equally, or more significant as energy sources. The overriding importance of total calories in energy balance needs to be stressed. I would suggest that Fig 1 may not accurately represent the relationship between energy intake and free sugars, or support the assertion in para 11.10 that “there appears to be an even greater reduction in energy	The 100kcal reduction in energy is one component of the basis for the sugars recommendation, and it was not intended for the total reduction in energy to come from sugars, but it provides one way of lowering total energy intake. The text of the report has been amended to make this clearer. SACN acknowledges that the estimations assume no dietary compensation for the additional energy supplied in the higher sugar diets and this may not reflect true dietary behaviour; however, the trials suggest that there is inadequate compensation. SACN agrees that Figure 1 in the draft report appeared misleading and have presented the data differently in the report.

	Submitter	Comments	Action agreed by SACN
		intake when sugars are consumed at 5% of energy". *See full response for detailed critique (point 5).*	Additional RCTs highlighted in the consultation have also been included.
	Sugar Nutrition UK	<u>The basis and calculations for a 28kcal reduction in energy intake for every 1% reduction in 'free sugars' is not transparent.</u> We request clarification and reliable evidence from the peer-reviewed literature that this theoretical modelling will achieve the desired outcomes (e.g. Weight/BMI reduction) in a 'real life' setting. The calculations supporting this modelling do not appear in the draft Report, nor in the associated literature review. It is stated that this figure "assumes no dietary compensation" but it is clear from the studies included in the review, that this is not the case. Even when subjects added large volumes of sugars-sweetened beverages to their diets, they still compensated for approximately half of the additional energy provided (Reid *et al.*, 2007). Furthermore, it is evident that values for total sugars, as well as for non-milk extrinsic sugars and sucrose have been used simultaneously to derive Figure 1, as well as the associated meta-analysis in the literature review. This use of different measures of sugars intakes distorts the data and is inappropriate given that the proposed recommendation is solely for 'free sugars'. *See full response under 'Obesity, body weight and energy intake' (p10-12)*. The outcomes of the reviews on body weight and eating motivation are not sufficiently described within the body of the main draft Report, which solely focusses on the potential impact of sugars on subjective measures of energy intake. As evidence from the RCTs presented in the energy intake review suggests that any effects of sugar(s) on energy intake may be transient, there is a clear need to control for study duration. Evidence presented in the draft Report and associated reviews do not show that 'free sugars' have any specific effect on energy intake or body	SACN acknowledges that the estimations assume no dietary compensation for the additional energy supplied in the higher sugar diets and this may not reflect true dietary behaviour; however, the trials suggest that there is inadequate compensation. The calculations that were performed to inform the sugars recommendation have been provided in the final report together with a full explanation for the basis for the recommendation. These have been updated to include additional trials highlighted in the consultation and confirm the relationship between sugars consumption and energy intake. It is acknowledged that some of the studies refer to total sugar but by restricting free sugars, total sugar intake is also lowered which will be of benefit in terms of energy intake. The reason for the lack of evidence on body weight and body mass outcomes is because a number of studies did not meet the minimum duration required to be included in the systematic review. SACN agree that that there is nothing specific about the effect of sugar when energy intake is held constant, apart from where

	Submitter	Comments	Action agreed by SACN
		weight, other than, like all macronutrients, being a source of calories. The energy intake section should distinguish between liquid and solid sources of sugars as there is evidence their compensation may differ (at least in the short term).	dental caries is concerned.
Comments on Figure 1	FDF	We would welcome clarification as to the rationale for joining together the end points of two different intervention groups within each trial. We consider it would be more appropriate to assess all of the data points available and draw conclusions from these. With respect to the above data, we would like SACN's views on the following, which we consider might influence the conclusions drawn: i. A comparison is being made in both the meta-analysis and figure 1 (chapter 11, p202) between the end points of two separate groups' energy intake, when these groups were not always matched for energy intake at baseline. For example in the paper by Drummond *et al.,* (2003) the two groups have a difference at baseline of 1.21 MJ/day. ii. Where available, control data are not included in figure 1 of the report, and this may lead to different interpretations of the data. For example, in the paper by Saris *et al.,* (2000), the energy intakes at follow-up for the higher sugars intervention group and the control group are not significantly different (10.4MJ/day, 10.3MJ/day), but the energy intake for the complex carbohydrate group (plotted as the lower sugars group) is 9.3MJ/day. This may indicate the lower energy intake is a feature of complex carbohydrate intakes not the sugars level. This is also recognised by the authors of the meta-analysis who in their conclusion state '*it should be recognised that diets that vary in sugars tend to vary in dietary fibre, energy density and GI*' (cardiometabolic health review, energy intake chapter 6, p102). iii. Plotting data from all of the intervention groups may help indicate more broadly the effects of changing levels of macronutrients. Although we recognise this report is only considering carbohydrates, it is important	Figure 1 was included in the draft report for illustrative purposes however, SACN agrees that it appeared misleading and has presented the data differently in the final report. Additional RCTs highlighted in the consultation have also been included.

	Submitter	Comments	Action agreed by SACN
		to consider the likely broader impact of dietary changes. For example in Brynes *et al.* (2003), there was an increase in energy intake on the high-fat intervention relative to all three high-carbohydrate interventions (low GI, high GI, high sucrose) however this is not captured within the analysis. This is also noted in the supporting evidence where it states in reference to Reid *et al.,* (2007), this '*does not demonstrate the impact on energy intake of sugars supplementation per se since no comparison with supplemental fat or protein was undertaken*' (cardiometabolic health review, energy intake chapter 6, p104). iv. Within the trials considered, two are hyper-caloric, providing high sucrose supplements (within food or drinks) that subjects are told to add to their diet (Raben *et al.,* 2002, Reid *et al.,* 2007). Adding sucrose in to the diet may have a different physiological and psychological effect, compared to the remainder of the trials which are isocaloric.	
	Nestle	The dose-response relationships between sugars intake and energy intake (Figure 1, page 201) was extracted from only 6 randomized controlled trials, and none of them reported sugar intakes below 4% of energy intake. Therefore, we agree with the SACN that given the limited amount of data, there is uncertainty about the shape of the curve at lower percentages of energy intakes.	SACN thanks the respondent for their helpful comment.
	Nutrition Society	Figure 1 of the SACN report seems to be pivotal in terms of driving the figure for a population target of 5 % energy derived from sugars in the diet. These data are derived from the endpoints of the studies and might look different if data were based on the change in sugars intake. SACN comment but dismiss the fact that there is only study down at 5% energy (Raben 2002 not 2001). In this study subjects were given large amounts of sucrose foods and mainly drinks (152g sucrose) per day or equivalent non-caloric sweetened foods.	Figure 1 was included in the draft report for illustrative purposes however, SACN agrees that it appears misleading and have presented the data differently in the report. Additional RCTs highlighted in the consultation have been included. SACN acknowledges the study design issues of Raben et al. 2002; however, the results of this study are in line with other studies where participants are consuming

	Submitter	Comments	Action agreed by SACN
		The rest of their diet was their normal diet eaten ad lib. The product substitutes were not iso-caloric so the study simply shows that adding a large amount of sugar to the diet results in an increased energy intake and slight weight gain – i.e. compensation was not complete. This was perhaps not surprising when sucrose % energy was changed from average 11% to about 28%. The converse was true of the low sugar substitutions – compensation to increase calorie intake was not complete. The Brynes (2003) study was a 4 arm study of 24 days in which subjects were given large amounts of olive oil, sucrose, instant potato or rye bread to help achieve the interventions namely high fat, sucrose, high GI and low GI. Figure 1 of the SACN report compares the high GI (instant potato) diet with the sucrose diet. If the sucrose diet had been compared with the olive oil diet (see Table 2 of Brynes 2003) the slope in Figure 1 would be in the opposite direction because fat has a higher propensity than sugars to increase energy intake.	lower quantities of sugar. Therefore, this study continues to form part of the evidence base.
	Sugar Nutrition UK	Moreover, we would question the selection process for the inclusion of studies in Figure 1. In many instances, the hypothesis of increasing sugar(s) intake with energy intake is not supported by the studies included. In two studies, published by Drummond *et al.* in 1998 and 2003, groups were counselled to either reduce fat alone or reduce both fat and sugar. In these studies, both groups reduced their energy intake during the interventions, and where measured, also lost body weight, irrespective of whether they increased or decreased their intake of sugar(s). These findings are misrepresented by Figure 1 of the draft Report as the baseline values are not taken into account. Relying solely on endpoint values is highly misleading. It is also worth noting for example, that in Drummond & Kirk (1998), whilst the group advised to reduce NMES and fat reported reductions in body weight of 0.5kg, EI of 1.31MJ and %NMES of 1.8% (%Total Sugars reduced 0.5%), the group advised to reduce fat alone also reported a	Figure 1 was included in the draft report for illustrative purposes however, SACN agrees that it appears misleading and have presented the data differently in the report. Additional RCTs highlighted in the consultation have been included.

	Submitter	Comments	Action agreed by SACN
		body weight reduction of 1.2kg and a reduction in EI of 0.77MJ, whilst simultaneously reporting an increase in %NMES intake of 0.7% (%Total Sugars increased 3.1%). This suggests that reducing overall energy intake is the over-riding factor for weight-loss in all of these studies, and is not specific to the sugars content of the diets. Secondly, the selective inclusion of test groups (not always suitable as controls) to include in Figure 1 and the meta-analysis may have significantly biased the reported outcome. We would therefore question the validity of Figure 1 and ask for its inclusion to be reconsidered. Further specific comments are made in regards to this figure and the data from which it is derived on page 13 of this response. Body weight data was not captured for the studies included in figure 1. We question why Raben et al. 2002 study was included given the excessive supplementary sucrose (3.4MJ per day) that the subjects were advised to add to their habitual diets. The use and connection of end point data from different test groups in figure 1 is misrepresentative and highly misleading. Also not all intervention groups were plotted. *See p13-14 of full response for details.* With the significant number of scientific queries surrounding Figure 1 and the high possibility of it being misread, we feel that, at least in its current format, it should be removed from the draft Report.	SACN acknowledges the study design issues of Raben et al. 2002; however, the results of this study are in line with other studies where participants are consuming lower quantities of sugar. Therefore, this study continues to form part of the evidence base.

Table 4: Fibre DRV recommendations

	Submitter	Comments	Action agreed by SACN
Fibre general	Ms Carol Williams and Dr Peter Watt	The SACN report will provide an opportunity to re-emphasise the value of 'starchy staples' and the increased guideline for dietary fibre will give a clear direction that these are best as wholegrain rather than highly processed starchy foods.	SACN thanked the respondents for their comments.
Fibre DRV: general points	British Nutrition Foundation	We support the move to establish a DRV in terms of AOAC fibre to align with labelling regulations in the EU and nutrition policy elsewhere in the world. It would seem important that the references to AOAC methodology are aligned with EC labelling requirements; we are not expert in this and so unable to comment on whether this is the case. The SACN fibre statement was published several years ago and we suggest it would be helpful to state whether or not it is fully aligned with the recent EC definition and associated European legislation.	The definition of dietary fibre in the Carbohydrates and Health report is intended to be in line with the Codex definition.
	Grocery Manufacturers Association	To facilitate a fibre definition with a greater degree of global harmonization, GMA urges UK SACN to reconsider their proposed definition of dietary fibre. The following definition of dietary fibre is more congruent with a variety of other recognized definitions (e.g. Codex, AACCI) 17, 18, 19: "Dietary fibre is defined as non-digestible soluble and insoluble carbohydrates (with 3 or more monomeric units) and lignin or other compounds associated with polysaccharides in the plant cell walls, such as waxes, cutin, and suberin, that are intrinsic and intact in plants, or that are isolated or synthetic".	SACN thanked the respondent for highlighting this error. The definition of dietary fibre was intended to be in line with the Codex definition and not be limited to carbohydrates that are naturally integrated components of food; the phrase 'naturally integrated components of food' has been removed from the definition of dietary fibre.
	Nutrition Society	2) I fully agree and support all changes related to fibre definitions, methodology, and new reference value. 3) One issue that was not addressed in the report, and it is relevant to fibre is that the way how total carbohydrate is estimated. In the UK, it is measured as the total of individually measured carbohydrate, but in many other countries, it is measured by difference. The new definition of fibre	SACN thanked the respondent for their comments The issue of specific methodologies are outside the remit of SACN and, therefore, it

	Submitter	Comments	Action agreed by SACN
		will reduce the total carbohydrate and increases the total fibre, but that is a positive change after all.	would not be appropriate to include this in the report.
Fibre DRV: in support	British Nutrition Foundation	We support the emphasis placed on the importance of dietary fibre and the need to increase intakes of fibre-rich foods, given that intakes are currently below the recommendations and the evidence for health benefits has strengthened. […] We welcome the fibre recommendations for children of different ages.	SACN thanked the respondent for their comments.
	Dr Madden & Dr Vafeiadou	Overall, we support the following recommendations: 30 g fibre using AOAC method.	SACN thanked the respondent for their comments.
	MRC Human Nutrition Research	We welcome for the first time specific recommendations for fibre intake in children, as this will allow clearer monitoring and commentary of children's fibre intake particularly within the NDNS RP.	SACN thanked the respondent for their comments.
	Safefood	The setting of dietary fibre targets for children in this report is also a welcome development.	SACN thanked the respondent for their comments.
Fibre DRV: criticism	British Dietetic Association	We support observation that higher intakes of fibre from a variety of food sources are strongly recommended. However, the recommendation is for a target that is a 25% increase from current target i.e. from 24g to 30g/d. We are not able to understand how this has been arrived at: Figures 2-6 (page 205-207) show no obvious dip in risks of diabetes, colorectal cancer, CVD or CHD at 30 vs 24g/d (dip appears to be at slightly below 20 for CVD and CHD). As current intakes in UK diet are considerably below current target figures, we are not sure that further expanding target has any real/achievable benefit. Looking at average intake data presented in table 3.13 (page 270), only about 3% of population would achieve the current target of about 24g/d i.e. 18g/d (non- starch	SACN thanked the respondent for their comments. To clarify how the dietary reference value was derived: figures 2 to 6 (figures 11.1 to 11.5 in final report) indicate that intakes of 30g/day and above (as defined using the AOAC methods 985.29 and 991.43) are associated with the greatest health benefits. The confidence intervals widen at intakes of 30g/day or more and the health risks are lower at 30g/day than at lower levels of intake. The

	Submitter	Comments	Action agreed by SACN
		polysaccharide). Our recommendation would be to keep the current more achievable target of 24g/d, which can be well supported by the information presented in Figures 2-6 (and match reference intake for fibre set by the European Food Standards Agency).	report's text has been amended to make these points clearer. From the NDNS, it is noted that around 10% of the population is already achieving a fibre intake of around 30 grams per day.
	British Nutrition Foundation	SACN recommends an increase in the dietary reference value for dietary fibre to 30 g/d (AOAC fibre). Useful graphs are presented in Chapter 11 but the reasoning behind picking 30g specifically could be made clearer in the accompanying text. Meeting this recommendation for dietary fibre within appropriate energy limits may prove to be very challenging for some sections of the population; especially as current fibre intakes are substantially lower than 30g/day. As foods that provide fibre (either as a naturally present component or as an added ingredient, e.g. a fibre isolate) also provide energy and potentially nutrients that need to be limited such as fat, free sugars or sodium, it would be helpful if the final report included some modelling to provide reassurance about the impact on energy, micronutrient density, salt intake etc., and the feasibility of meeting the recommended level of consumption in the UK population (for different age groups) in the context of other dietary constraints (energy, sodium, fat etc.). In recent years, as the requirements of EFSA in relation to evidence to support fibre-related health claims has become clearer, it is likely that there will have been a number of publications reporting studies in this area using a range of discrete fibre (poly- or oligo-saccharide) components. These may not have been captured owing to the timeframe of the literature search; for example we are aware of a recent RCT with increased faecal weight as an outcome that is not included in Chapter 8. We suggest that it would be helpful to check for recent papers in this field, as has been done in other parts of the review (e.g. the incorporation in the draft report of the 2014 Greenwood paper referred to above).	SACN thanked the respondent for their comments. To clarify how the dietary reference value was derived: figures 2 to 6 (figures 11.1 to 11.5 in final report) indicate that intakes of 30g/day and above (as defined using the AOAC methods 985.29 and 991.43) are associated with the greatest health benefits. The confidence intervals widen at intakes of 30g/day or more and the health risks are lower at 30g/day than at lower levels of intake. The report's text has been amended to make these points clearer. From the NDNS, it is noted that around 10% of the population is already achieving a fibre intake of around 30 grams per day. Consideration of the impact of increased fibre intakes on energy and nutrient intakes is beyond the scope of the report's risk assessment**.** SACN thanked the respondent for highlighting the recent RCT by Timm et al. (2013), which has now been included in the report.

	Submitter	Comments	Action agreed by SACN
	Fibre Consortium	We support the setting of population reference intakes for dietary fibre, which confirms the role of fibre as a key nutritional component of a healthy balanced diet. However, we note the 30g/day is derived from non-linear dose response plots looking at the relative risk of various non-communicable diseases against grams of fibre per day. From the dose curves presented in the main report, it is unclear why 30g has been selected, and it would be useful for SACN to provide clarification as to how this value was chosen. We note that SACN considered feasibility of achieving 30g by considering one daily menu, and we understand that dietary modelling / feasibility of achievement is not usually incorporated into setting DRVs (with the notable exception of salt where the 1991 dietary reference value set a reference nutrient intake for salt of 4g, and subsequent COMA, and then SACN recommendations revised this to 6g on the basis this was 'considered to be an achievable goal for the UK population, rather than an optimal or ideal level of consumption'). However, the FC believes further modelling work should be undertaken to understand the feasibility of this recommendation. If isolated and extracted fibres are not included in the proposed 30g/day DRV, we believe it would be challenging to meet the DRV on a regular basis, alongside other nutrient and energy recommendations. Thus we believe that isolated and extracted fibres could be valuable contributors to help consumers achieve this daily DF recommendation.	SACN thanked the respondent for their comments. To clarify how the dietary reference value was derived: figures 2 to 6 (figures 11.1 to 11.5 in final report) indicate that intakes of 30g/day and above (as defined using the AOAC methods 985.29 and 991.43) are associated with the greatest health benefits. The confidence intervals widen at intakes of 30g/day or more and the health risks are lower at 30g/day than at lower levels of intake. The report's text has been amended to make these points clearer. From the NDNS, it is noted that around 10% of the population is already achieving a fibre intake of around 30 grams per day. Consideration of the impact of increased fibre intakes on energy and nutrient intakes is beyond the scope of the report's risk assessment. SACN noted that fibre intake should be provided from a variety of food sources. SACN clarified that the recommendation was not intended to discourage the consumption of extracted or isolated fibres, but as the evidence base in the report, for extracted or isolated fibres, is limited, it was agreed that some cautious wording was required to reflect this point.

	Submitter	Comments	Action agreed by SACN
	FSAI	The DRV recommended for total dietary fibre intake is given in absolute terms as a goal of 30g per day and this will only be achieved by those with high energy intakes. Consideration should be given to setting the requirement in terms of energy needs and providing the recommendation in terms of overall food intakes – i.e. a certain fibre density (g fibre/MJ). Such an approach will adjust fibre intakes for those with lower energy needs (small adult females) and protect against compromising micronutrient status. Achieving absolute dietary fibre goals >25g per day is difficult for those with energy needs below 9.2MJ/day (Flynn *et al* 2011b).	The fibre DRV of 30 grams per day is a population recommendation that may not always be appropriate in individual cases and some individuals may require less fibre. It was highlighted that the proposed DRV for fibre is set to meet the needs of 97.5% of the population and may not be applicable to the remaining 2.5% of the population.
	Grocery Manufacturers Association	SACN indicate in the report the quality of evidence has been strengthened on the relationship between a diet rich in fibre and reduced risk for Non-Communicable Diseases (NCDs) such as type 2 diabetes mellitus, cardiovascular disease and colorectal cancer. This evidence is used as the basis for increasing the DRV for fibre to 30g/day. We ask that SACN reconsider the proposed increase of the fibre DRV from 23-24g/day to 30g/day (a 20-24% increase). Consumption studies indicate that fibre intake is closely linked to calorie intake; thus, recommendations to reduce calorie intake may make increasing fibre intake challenging. Conversely, recommendations to increase fibre intake may increase calorie intake. In addition, the 30g recommendation is not appropriate for people requiring fewer calories. Finally, from a global perspective, both the WHO/FAO and EFSA recommend 25g of fibre per day as the amount needed for healthy laxation.	From the NDNS, it is noted that around 10% of the population is already achieving a fibre intake of around 30 grams per day. The fibre DRV of 30 grams per day is a population recommendation that may not always be appropriate in individual cases and some individuals may require less fibre. It was highlighted that the proposed DRV for fibre is set to meet the needs of 97.5% of the population and may not be applicable to the remaining 2.5% of the population.
	Professors James & Sheehan	The increase in fibre intakes proposed may not be possible without a marked concomitant reduction in dietary fat if further weight gain is to be avoided when advocating the consumption of higher fibre rich foods. The practicality of the proposed increased fibre intake should be illustrated and the risks of further inappropriate weight gain highlighted.	From the NDNS, it is noted that around 10% of the population is already achieving a fibre intake of around 30 grams per day.

	Submitter	Comments	Action agreed by SACN
		We note the intriguing analyses and graphic displays in Figures 3-6 of the SACN report. The SACN proposes that fibre intakes should be increased to 30g/d on average and evidence is cited to suggest that this is compatible with current intakes of a proportion of the population. One suspects that these individuals are on a relatively high total carbohydrate intake and some assessment should be made of this because if SACN produces its final report with a proposal for a 30 g fibre intake then this might lead to an increase in energy intake unless it was explicitly made clear the extent to which sugar, refined starches and fat intakes need to be reduced to allow this fibre intake to be achieved without weight gain.	
	Professor Chris Seal	Increasing the target for consumption to 30g/day in line with more global recommendations is appropriate, but this will bring into sharp focus the current shortfall in intake. This message is somewhat lost in the report.	SACN considers the text in the report to be adequate. PHE will consider how messages for consumers on how to increase fibre intakes/achieve fibre recommendations may need to be amended.
	Nestle	We welcome the recommendation to increase fibre intake. However, we would like to have more clarity about how the value of 30g was derived. The relationship between fibre intake and risk of cardiovascular disease, coronary heart disease, stroke, type 2 diabetes and colorectal cancer are clearly shown in figures 2-6 respectively. In section 11.19 (page 204) it is concluded that, “From these data, it is apparent that intakes of 30g/day and above … are associated with the greatest health benefits in reducing the incidence of cardiovascular diseases [fig2], type 2 diabetes mellitus [fig5] and colo-rectal cancer[fig 6].” We have looked carefully at figures 2, 5 and 6, and we are not clear how a threshold of precisely 30g was selected. Therefore, we would like the SACN to explain how this figure was derived. Alternatively, given the lack of clarity, we suggest that a recommendation of “around” 30g or	SACN thanked the respondent for their comments. To clarify how the dietary reference value was derived: figures 2 to 6 (figures 11.1 to 11.5 in final report) indicate that intakes of 30g/day and above (as defined using the AOAC methods 985.29 and 991.43) are associated with the greatest health benefits. The confidence intervals widen at intakes of 30g/day or more and the health risks are lower at 30g/day than at lower levels of intake. The report’s text has been amended to make these points clearer. From the NDNS, it is noted that around 10% of the population is already achieving

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		more might better reflect the science.	a fibre intake of around 30 grams per day.
	Nutrition Society	**Dietary Fibre: Focus on natural sources** The emphasis within the report that dietary fibre should mainly come from natural sources is appropriate. The majority of the evidence is based on prospective cohort studies where intakes essentially reflect dietary fibre coming from natural sources, as there is limited history of wide scale fibre fortification practices. **Dietary Fibre: DRV of 30g and potential implications of a perceived 'fibre gap'** This represents quite an increase from previous DRV, and is higher than current average intakes. In conjunction with the position that dietary fibre intake should be from natural sources the implied message is that the 'fibre gap' should be met by increased intakes of fruit, vegetables and wholegrain products. However in practice the suggestion that there is a 'fibre gap' is already being used to market products fortified with resistant oligosaccharides and resistant starch. This is not consistent with the position taken in the report where the focus is on naturally occurring sources. It may be appropriate to extend the last statement in 12.27 (and possibly also 12.33) to emphasise that in terms of meeting DRV for dietary fibre, a cautious approach should currently be adopted in order to avoid overconsumption of fortified products and the potential displacement of natural high fibre foods from the diet. **Dietary Fibre: Codex, EC and SACN definitions are not defined by methodology** The Codex, EC and SACN definitions of dietary fibre are similar in principle, describing the carbohydrate component escaping digestion in the small intestine but with the added provision that extracted or synthesized components must be demonstrated to have a physiological	SACN thanked the respondents for their comments. The report recommends that the recommended dietary fibre intake should be achieved through a variety of food sources. The definition of dietary fibre was intended to be in line with the Codex definition and not be limited to carbohydrates that are naturally integrated components of food; the phrase 'naturally integrated components of food' has been removed from the definition of dietary fibre.

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		benefit. Although a departure from other nutrient classifications, these dietary fibre definitions do provide the broad criteria by which to include or exclude various components. The criteria set out in the definition are sufficient description and as outlined below attributing fibre to what is recovered by a single method may be counterproductive. In section 12.27 of the report it states: Dietary fibre should be defined as all carbohydrates that are naturally integrated components of foods and that are neither digested nor absorbed in the small intestine and have a degree of polymerisation of three or more monomeric units, plus lignin. Dietary fibre is to be chemically determined using the Association of Official Analytical Chemists (AOAC) method 2009.01 (McCleary et al., 2010; McCleary et al., 2012). Several aspects of this statement would benefit from clarification to limit inconsistencies: - The definition here is focused on the naturally integrated components only, with the implication that when extracted and synthesised components are present they are considered by a separate set of criteria. This approach would seem to fit best with the current evidence. - The naturally occurring components are: NSP and the small amounts of lignin associated with plant cell wall material; resistant starch, which in the context of most processed foods in the human diet is restricted to RS type 3 only; resistant oligosaccharides, which are limited to fructans (cereals onions etc) and alpha-galactosides (legumes) occurring naturally. These components can be measured specifically by chemical methodologies of which there are several available as recognized by Codex Alimentarious when this topic was considered. - In contrast, the AOAC 2009.01 is the only method specified in the	

	Submitter	Comments	Action agreed by SACN
		statement. However, the phase 'chemically determined' used in the statement is not consistent with this methodology, which is instead empirical in nature rather than measuring components specifically. The implication is that the method does not provide information on what has been recovered and therefore no possibility of evaluating conformity with the actual definition. The AOAC 2009.01 will recover a wide range of extracted and synthesized components which may or may not conform with the definition. - In terms of measuring RS, for most processed foods that will only contain RS type 3, the AOAC 2009.01 method offers no advantage over the more commonly used AOAC gravimetric fibre methods that also recover RS3. - In terms of measuring the resistant oligosaccharides, the AOAC 2009.01 does this by a refractive index HPLC technique that provides no information on the components measured. Some laboratories have reported inflated values for this part of the method indicating that accuracy may sometimes be an issue for some product types. In practice fructans and alpha-galactosides can be measured specifically when present, representing viable analytical options for measurement of the naturally occurring oligosaccharides. In summary dietary fibre is now defined by a set of chemical/origin/functional criteria, rather than by what is recovered by a specific method. Any method or combination of methods that correctly identify the dietary fibre components present in foods would be appropriate. Sufficiently detailed analytical tools should be available to provide distinction between component types. Such distinctions are important both for correct labelling and also to ensure that sufficiently detailed information is available to assess the impact of various fibre types in	

	Submitter	Comments	Action agreed by SACN
		future research studies.	
Fibre recommend-dations	Clasado	It seems that from the following recommendation, non-digestible oligosaccharides would be excluded from health benefits related to fibre intake (where we understand that 'isolated dietary fibres' includes 'non-digestible oligosaccharides'): • Dietary fibre intake should be largely achieved from a variety of foods, such as whole grains, pulses (e.g. kidney beans, haricot beans, lentils), potatoes, vegetables and fruits, where it is a naturally integrated component. At this time, it is not known whether extracted or isolated dietary fibres would convey the range of health benefits associated with the consumption of dietary fibre rich foods. The draft Report cites many instances where non-digestible oligosaccharides have effects that are potentially health related, but carry the caveat 'whether this effect is beneficial or of biological relevance is currently unclear': • Non-digestible oligosaccharide or inulin and fractional calcium absorption (9.49-9.50) • Infant faecal bacteria (9.51-9.53) • Infant faecal pH and short chain fatty acid content (9.56-9.57) • Fructo-oligosaccharides and faecal bacteria (9.26-9.27) • Galacto-oligosaccharides and faecal bacteria (9.28-9.29) Two exceptions were: The effects of non-digestible oligosaccharides on fasting blood lipid concentrations (9.6-9.8) and on faecal weight (9.18-9.23) were both denoted as 'biologically significant'. We feel that the phrase 'it is not known whether extracted or isolated dietary fibres would convey the range of health benefits associated with	SACN thanked the respondent for their comments. The text in the report has been amended. Cautious wording has been used because at this time it is not known whether extracted or isolated dietary fibres would convey the' full ' range of health benefits associated with the consumption of dietary fibre rich foods. Changes to the intestinal microbiota are not considered a beneficial physiological effect in themselves. The draft report does not include a full review of the beneficial physiological effects associated with consumption of dietary fibres and those detailed are not a comprehensive or exclusive list. There may be other beneficial physiological effects of dietary fibres and the list may be added to in the future. Text has been amended.

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		the consumption of dietary fibre rich foods' does not reflect the real situation and should be modified to associate 'isolated dietary fibres' with health benefits, with an additional comment that further research will clarify the health associations. The draft Report mentions that 'recent and future developments of novel food ingredients may substantially increase the intake of these oligosaccharides'. Modification of the recommendation as we suggest will provide an impetus for future research and development of these dietary fibres.	
Wholegrain	Grocery Manufacturers Association	SACN's final recommendations do not call out a specific whole grain recommendation, rather the health benefits of whole grain were acknowledged within the dietary fibre recommendations. However, there is an opportunity to differentiate the separate benefits of whole grain separate from dietary fibre recommendations. When controlled for fibre, evidence shows whole grain intake has independent health benefits. Per SACN's own review, evidence indicated that whole grain intake has health benefits separate from fibre, such as lower incidence of cardiovascular disease, type 2 diabetes mellitus, hypertension and colon cancer (section 12.16) While whole grain recommendations may have been difficult to refine, due to variances in whole grain definitions across studies, as noted in the SACN report as well as the rigorous exclusion/inclusion criteria used, we recommend that SACN consider specific whole grain recommendations based on associated health benefits. The importance of whole grain as part of a healthy dietary pattern is recognized by many countries which is evidenced by specific dietary guidance for whole grain intake. Additionally, SACN could resolve some of the challenges in providing a recommendation specific to whole grain if the research evaluated under total cereals and whole grain bread were combined as SACN has not articulated rationale for separating this research. We recommend SACN use a recent roundtable report regarding a definition of whole grain foods which would standardize a whole grain food as characterized by 8g of whole grain per 30g of product	SACN considered that the diversity of wholegrain definitions applied within the evidence base would make a generalised statement about wholegrain intake unreliable. SACN is aware that a consensus definition of wholegrain has been developed, but this definition was not applied by the studies that informed this review. SACN reasoned that the two categories, whole grain bread and total cereals intake, seemed distinct and agreed that they should be considered separately.

	Submitter	Comments	Action agreed by SACN
		as opposed to the health claim standards cited in 2.38 -2.39. We also recommend additional literature and endpoints be considered for evaluation, such as body weight and body composition. We urge the Committee to continue to elevate the importance of whole grains as an important source of fibre and other nutrients through specific recommendations for dietary intake. While recent scientific findings have confirmed the importance of whole grains in helping to meet fibre recommendations, fibre content is not a consistent predictor of whole grain content nor does it ensure whole grain intake. The fibre content of a whole grain food will also vary depending on the type of grain, density of the product, moisture content, and other ingredients that define the product characteristics. In addition to fibre, whole grains provide vitamins, minerals and phytonutrients that contribute to diet quality and may help reduce risk of diseases. Although it is often overlooked, whole grains contain higher levels of beneficial phytonutrients than many fruits and vegetables. 32 We encourage further study of other beneficial constituents of whole grain.	
	Professor Chris Seal	[a] There is a strong scientific consensus about the health benefits of increased whole grain consumption, although the mechanisms are unclear. I welcome the report recommendation to promote whole grains as key constituents of a healthy carbohydrate diet pattern as I and others have advocated for some time. Adoption of increased whole grain consumption will be essential if the target for higher fibre intake is to be achieved. [b] The draft report focusses on the benefits of whole grain on cardiometabolic risk factors/markers with less emphasis on cancer, overall digestive health, weight maintenance and, from more recent evidence, body fat distribution. The report comments on difficulties in interpreting the available evidence for health benefits of whole grain but fails to make reference to these when developing future research	[a] SACN thanked the respondent for their comment. [b] SACN considered that the diversity of wholegrain definitions applied within the evidence base would make a generalised statement about wholegrain intake unreliable. SACN is aware that a consensus definition of wholegrain has

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		recommendations. Key factors for consideration include setting definitions of whole grain and wholegrain foods, servings/portion sizes of wholegrain foods and recommendations for intake. These must be addressed by the Committee so that appropriate strategies for promoting whole grain consumption can be developed for the consumer and which will help direct labelling and advertising in the food industry. I would advocate adoption of the Healthgrain Forum definition (van der Kamp et al., 2014) which has been developed by a large consortium of academic and industry members with a pan-European membership. At a global level a consensus statement on definitions of wholegrain foods has been recently published which the Committee may wish to consider (Ferruzzi et al., 2014). The US definition of a serving of whole grain as one ounce-equivalent (or 16g) has been adopted by many countries as part of dietary recommendations and has been used in the majority of published observational and cohort studies. [c] The current US recommendation for whole grain intake [which is likely to be raised upwards in the new Dietary Guidelines] is 3 servings per day, or 48g [not 85g p153 Chapter 1]. On this basis I was surprised to see that the reviewers chose to use a serving of 40g for one study in their meta-analysis since this distorts the intake data upwards considerably [p159 Chapter 1]. [d] The estimate of whole grain intake for the UK used in the report [mean of 0.5 servings per day based on the paper by Lang et al. (2003)] is misleading. The Lang paper reports median intakes as 2.5 servings per week and defines a 'serving' of wholegrain food as "each occasion any of these identified codes appeared in a dietary record for each individual, regardless of portion size" (Lang et al., 2003). Thus 'serving' in this context is an 'eating occasion' and is not an accurate measure of whole grain intake and is not comparable to the cohort data presented in the report, which are based on the US definition of 16g whole grain/serving.	been developed, but this definition was not applied by the studies that informed this review. [c] The 2010 USDA recommendation is for 3 ounce equivalents/day of whole grains: 3 ounces = 85g. So that one study could be included in the meta-analysis (Jensen et al., 2004), an average serving size of 40 grams was assumed. [d] SACN thanks the respondent for these comments. However, it is not possible to redo the meta-analyses at this stage using a better indicator of UK intakes.

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		The Lang data are also superseded by data we published on absolute levels of intake (Thane et al., 2005; Thane et al., 2007). These data suggest median whole grain intake was approximately 14-16g/d or 0.9-1.0 US servings of whole grain for the two NDNS surveys. We have recently presented data at the Nutrition Society Summer Meeting in Glasgow, and a paper submitted for publication, based on the NDNS RP 2008- 2011. These more recent data suggest that whole grain intake has risen slightly since 2001.	

Table 5: Oral health

	Submitter	Comments	Action agreed by SACN
Frequency / amount of sugars consump-tion	British Association for the study of Community Dentistry	With regard to the dental caries process both amount and frequency of consumption are key and underpin current advice regarding prevention of tooth decay. However within the document they are considered in several areas with no clear message that could be easily transferred to public health advice. The rationale regarding the importance of frequency is discussed in chapter 2 with no clear link to the findings regarding frequency in chapter 6.	There is a difference between advice given on an individual level and a public health message. From a public health stand point the available evidence in the report indicates that the amount of sugars is a significant variable. SACN acknowledges that both the amount and frequency of sugars consumption are highly correlated, however frequency is a difficult indicator to measure. This is probably the reason why there is much less evidence to support an association between frequency of consum-ption and dental caries. These points will have been highlighted in the report. Gustafsson et al. (1954)[13] is the only study to show significant correlation between frequency of sugars consumption and dental caries; however, as the study was not randomised, it did not meet the inclusion criteria for the oral health review. It should be noted that Moynihan and Kelly (2014)[14] came to similar conclusions to SACN's with respect to frequency and amount in their review for WHO.

[13] Gustafsson BE et al. The Vipeholm dental caries study; the effect of different levels of carbohydrate intake on caries activity in 436 individuals observed for five years. Acta Odontologica Scandinavia. 1954; 11 (3-4): 232-264.

[14] Moynihan PJ and Kelly SA. Effect on caries of restricting sugars intake: systematic review to inform WHO guidelines. Journal of Dental Research. 2014; 93 (1): 8-18.

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	FDF	Describes evidence around the relationship between frequency and amount of sugars consumption. It seems reasonable to control for frequency when looking at amount of sugars consumption and vice versa. Neither frequency nor amount of sugars consumption is noted as confounding factors and the rest of the oral health review document does not clarify this information. We would welcome this information being made available to help interpret the results found by SACN regarding sugars and oral health.	Frequency and amount of intake were not mutually controlled for in the cohort studies investigating consumption of sugars and dental caries. SACN considered it inappropriate to control for frequency or amount of sugars in the diet because the amount consumed needs to be known irrespective of how many times it is consumed and vice versa. A footnote has been added to table 5 of the Oral Health Review to address this point.
	Grocery Manufacturers Association	Frequency of consuming sugar-containing foods (rather than total amount of sugar) is the primary dietary factor by which sugars contribute to risk of dental caries. It is only the correlation of sugar intake with frequency of intake that explains an apparent association between sugars and dental health. This does not provide evidence for a threshold. Makes reference to findings of IOM (2002) and EFSA (2010). *See page 5 of full response for details.*	SACN found no evidence of an association between frequency of sugars consumed and dental caries; however this may be due to the lack of evidence rather than there being no evidence. Gustafsson et al. (1954)[13] is the only study to show significant correlation between frequency of sugars consumption and dental caries; however, as the study was not randomised, it did not meet the inclusion criteria for the oral health review.
	PHE – Dental Public Health	6.61, 6.6.2 these paragraphs relate to frequency of sugars consumed and caries in the mixed and permanent dentitions, reporting no association. The studies is this section record frequency using repeat diet diaries and 24 hour recall, these may be prone to bias and misclassification of exposure. Also if the caries levels in the populations are low, then it is less likely that any effect will be detected.	SACN thanked the respondent for their comments; however it was not possible to account for these from the available evidence.

	Submitter	Comments	Action agreed by SACN
		There is a close correlation between sugar intake frequency and amount, and it is difficult to distinguish between them (Joyce et al. 2008; Rugg-Gunn et al. 1984; Rugg-Gunn 1993). Due to the requirement to record intake frequencies at the daily level (rather than weekly or monthly), it is always more difficult to obtain accurate measurement for frequency of intakes, which is partly why the evidence for frequency of intake and sugars is not as strong as for amount. It would be helpful if this correlation could be made clearer in the discussion of the evidence presented. A particular challenge is measuring frequency of exposure in the mixed and permanent dentition (school-aged children), as the age at which children become accurate self-reporters of dietary intake is estimated to be 12 years (Livingstone & Robson, 2000). A systematic review (Burrows et al., 2010) found that the 24-hour multiple-pass recall method conducted over a 3 day period including week and weekend days (using parents to report), was the most valid method for assessing dietary energy intake in children aged 4-11 years, compared to doubly labelled water. It would be useful if this could be highlighted in the final oral health systematic review.	
	Professor Rugg-Gunn	It should be noted that in free-living populations there is a close correlation (+0.77) between frequency of intake and weight of intake of high sugar foods. Both are important, and the failure to record significant associations between frequency of intake of sugars and dental caries (Paragraph 6.62) is likely to be because (a) frequency is a difficult variable to record and therefore subject to error, and (b) frequency is a discrete variable with the attendant difficulties of recording statistically significant correlations as you have indicated in your reference to Appleton et al. 1986.	SACN thanked the respondent for their comments.
	Sugar Nutrition UK	The draft Report is in contrast with other scientific reviews and expert committee reports with regard to the association between frequency and amount of sugars consumption and dental caries risk (*see page 15-16 of*	SACN found no evidence of an association between frequency of sugars consumed and dental caries; however this may be

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		full response for details). We strongly urge reconsideration of compelling historical data (Gustafsson et al., 1954 omitted due to lack of randomisation), given that its methodology could not be replicated today. Describes the findings of two in situ studies Ccahuana-Vasquez et al. (2007) and Duggal et al. (2001) (page 16).	due to the lack of evidence rather than there being no evidence. Gustafsson et al. (1954)[13] is the only study to show significant correlation between frequency of sugars consumption and dental caries; however, as the study was not randomised, it did not meet the inclusion criteria for the oral health review. *In situ* trials were only included for dental erosion endpoints.
Confound-ing factors	FDF	The production of acid by bacteria in response to foods is an important confounding factor. We would welcome inclusion of the data on whether studies controlled for starch intakes when looking at sugars (or vice-versa) to distinguish between which carbohydrates may be responsible for the results seen. Neither starch nor sugars are included in the confounding variables considered (oral health review, SACN supporting documents, table 5 'confounders considered in prospective studies investigating dental caries risk', p24).	SACN thanked the respondent for highlighting this issue. Most cohort studies did not specify whether they adjusted for starch intake or not.
Definition of sugars in studies	Sugar Nutrition UK	The studies used in support of the association between amount of sugars consumed and dental caries do not define the term 'sugar' and so it is unclear precisely what is meant by this term. Therefore, this could be a single mono- or disaccharide, or a mixture of any of these. This is itself noted within the review, but is not mentioned in the draft Report. In light of this, we question whether it is legitimate to relate any of the outcomes of the review to the term 'free sugars' as defined by the draft Report.	SACN thanked the respondent for highlighting this issue. The term used when referring to these studies should be 'sugars' to reflect the fact that the sugar may not be sucrose. Text has been added to the report to clarify this point. From the evidence it is clear that there is a need to reduce 'total sugars' intake; reducing free sugars provides a mechanism for doing this.

	Submitter	Comments	Action agreed by SACN
Applying child data to the adult population	Professors James & Sheiham	Adult caries should be emphasized in the context of the recommendations relating sugar intakes to dental caries as well as to adult weight gain- we consider that the recommendation should be reworded to highlight the applicability of the recommendation to adults as well as to children. *See p13-14 of the full response for details.* The recommendations for Dietary Reference Values for sugars outlined in Paragraph 11.13 are clearly based mainly on energy imbalance but a more appropriate interpretation of epidemiological data relating to the disease process of dental caries would have changed the emphasis of the report and led to a more stringent recommendation for free sugar intakes.	SACN notes that the mechanism for the development of dental caries is the same for adults as it is for children. This is in line with the opinion of other dental health experts and reflected in the Moyniham and Kelly (2014)[2] systematic review conducted for WHO which is cited in the report. The recommendations have been amended to reflect that the conclusions on dental caries also apply to adults.
	PHE – Dental Public Health	On page 104 the following is stated 'there is also a lack of evidence to assess the impact of sugars intake on oral health in adults, as all included studies and trials were conducted in children and adolescents' Data from five studies relating to adults was included in the recent review commissioned by the WHO (Moynihan & Kelly, 2014), but the design of those studies (non-randomised intervention, cross-sectional, and population level) meant that they did not meet the inclusion criteria for the SACN review. SACN considered only prospective cohort studies and randomised controlled trials, as they provide a higher level of evidence regarding causation at the individual level. However, the WHO review states that "for the analysis relating dental caries in adults, data were not downgraded for indirectness, although all cohort studies were conducted in children" because "the aetiology of dental caries is the same in children and adults". It would be helpful for SACN to state their view explicitly regarding this approach. However if no data regarding adults is to be included in the final report it would be helpful if this was stated earlier in the document rather than only in the summary and conclusions.	SACN notes that the mechanism for the development of dental caries is the same for adults as it is for children. This is in line with the opinion of other dental health experts and reflected in the Moyniham and Kelly (2014)[2] systematic review conducted for WHO which is cited in the report. The recommendations have been amended to reflect that the conclusions on dental caries also apply to adults.

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	Sugar Nutrition UK	The studies cited were all carried out in children, therefore reliable conclusions cannot be drawn as to how this applies to the population as a whole, or what benefit, if any, reducing population sugar intakes would have on dental caries in adults.	SACN notes that the mechanism for the development of dental caries is the same for adults as it is for children. This is in line with the opinion of other dental health experts and reflected in the Moyniham and Kelly (2014)[2] systematic review conducted for WHO which is cited in the report. The recommendations have been amended to reflect that the conclusions on dental caries also apply to adults.
Grading of evidence	FDF	Within the oral health review supporting documents (section 132 p46 and 180 p59), SACN comment that 'the evidence linking the development of dental caries to sugars consumption/intake is relatively weak', however the summary (SACN draft report, chapter 6, section 6.60, p97) states an association based on moderate evidence without the comment on the strength of the link. We recommend SACN clarifies the basis for the conclusion regarding the strength of the association and, for consistency, report this across both the supporting documents and the report.	The evidence from the systematic review was indeed qualitatively described as 'relatively weak', but this is not the final grading of the evidence. The relationship was further supported by data in both strength and direction from the narrative review and was then considered sufficient for grading this as 'moderate', consistent with criteria in SACN guidelines for (up)grading of evidence.
	Sugar Nutrition UK	The Carbohydrates and Oral Health review notes that "evidence linking the development of dental caries to sugars consumption is relatively weak." (p.46; paragraph 132). However, the draft Report assigns a stronger tone to the level of evidence, suggesting there is "moderate evidence" for an association. The draft Report notes "moderate evidence" for an association between the amount of sugar consumed and dental caries based on five publications. Of these, two report the same cohort study (Rugg-Gunn et al., 1984, Rugg-Gunn et al., 1987) and another did not adjust for tooth brushing (Campain et al., 2003), thus leaving three cohort studies on	The evidence from the systematic review was indeed qualitatively described as 'relatively weak', but this is not the final grading of the evidence. The relationship was further supported by data in both strength and direction from the narrative review and was then considered sufficient for grading this as 'moderate', consistent with criteria in SACN guidelines for (up)grading of evidence.

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		which to form an opinion. We would question the strength of this evidence, based on this duplication of findings, and propose that the association is downgraded to “limited”, to comply with SACN criteria. It is important to note that the evidence base underpinning this association is limited to prospective cohort studies, for which no meta-analysis could be performed. Only one randomised controlled trial was noted, which investigated the relationship between sugar and dental caries. The study did not find any significant effects of fructose and glucose compared to sucrose on caries development (Frostell et al., 1991). Therefore, any relationship that has been observed in the Oral Health review is unable to show cause and effect and it is unclear as to how the proposed recommendations are likely to impact on the dental caries experience of either children or adults within the UK population.	
Methodol-ogy	British Association for the study of Community Dentistry	The oral health systematic review is helpful however it reviews the literature using a different structure than the final report so that it is difficult for the reader to find the evidence underpinning statements in the final report and sometimes the two cite different literature to support the same statements.	SACN notes that the report is structured differently to the systematic reviews; however due to the extensive nature of the reviews it is not possible to replicate the lay out in the Carbohydrates and Health report. The intention is that the supplementary material and the report should be read in conjunction with each other.
	Professors James & Sheiham	Describes the validity for including ecological evidence (*see page 9 of full response for details*). The fundamental link between the presence of free sugars and caries, doubtless understood by SACN, cannot be dismissed by epidemiologists if these analysts of population data do not take account of the intrinsic biology of dental caries development. Therefore the sugar/dental caries intrinsic link allows the use of so-called ecological evidence as a fundamental part of the epidemiological analysis. Analyses	SACN set out the study inclusion criteria at the beginning of the review which cannot be changed at this late stage. The findings of ecological studies that have brought to the attention of SACN have been considered, but in view of the limitations of these data, they cannot be used to set

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		are intrinsically incomplete and likely to be unsound if they rely only on trial evidence or cohort studies.	dietary recommendations.
	PHE – Dental Public Health	Acknowledges the reasons for Including only prospective cohort studies and randomised trials (page 2). Where high quality evidence is lacking a more pragmatic approach looking at the weight of the evidence available may be helpful.	SACN set out the study inclusion criteria at the beginning of the review which cannot be changed at this late stage. The findings of ecological studies that have brought to the attention of SACN have been considered, but in view of the limitations of these data, they cannot be used to set dietary recommendations.
	Professor Rugg-Gunn	I agree with the summaries and conclusions of evidence given in Paragraphs 6.59 to 6.70, 6.77 to 6.79, and 12.9. Had the review of evidence included all published studies on dietary sugars and dental caries, including animal studies, laboratory studies and human ecological studies, the evidence base for concluding that dietary sugars are the major cause of dental caries would have been much stronger: all types of study point in the same direction.	It is the view of SACN that the evidence base for concluding that dietary sugars are the major cause of dental caries is strong enough without including animal studies, laboratory studies and human ecological studies.
	UCL Dental Public Health Group	In the oral health section it is somewhat confusing and unclear how it was decided which studies belonged to the different sub categories i.e. sugars, sugars-containing beverages, and sugar-containing foods. It is also very important that clarification is made on the importance of using fluoride toothpaste for tooth brushing when individual studies are assessed. Tooth brushing per se is not important as a caries preventive measure, it is the fluoride toothpaste that has an effect. (pages 97-100)	The basis of the categorisation of sugars exposures is given in the systematic review on this subject and was based on the description given by the authors of the various studies in their papers. We accept that fluoride in toothpaste is the active agent in any interaction in this area BUT very few if any studies differentiate between fluoride and non-fluoride toothpaste use. Furthermore, fluoride is almost universally prevalent in pastes so we decided that studies which controlled

	Submitter	Comments	Action agreed by SACN
			the outcome for brushing would be controlling for fluoride use from this source de facto. The data however were presented by the authors as reported brushing not as fluoride toothpaste use.
Misclassifi-cation of evidence	Sugar Nutrition UK	The oral health review notes the importance of in situ studies (paragraph 38), in which "the effects of sucrose were shown to be dependent on dose and the frequency of application, as well as being militated against by fluoride administration." However, five out of the seven citations looked at neither dose, nor frequency. Of the remaining two, one investigated the effect of various concentrations of test solution (which does not necessarily equate to overall dose consumed) and the other investigated frequency. We are concerned with the implications of this misclassification of these studies and ask that the findings within this section are reviewed. In addition, whilst inclusion criteria were set for in situ studies such as these, the seven studies cited in paragraph 38 are not discussed further and do not form part of the review or draft Report. We would seek to understand the grounds for this exclusion, and urge that they are taken into consideration to ensure totality of the data.	The review only included the dental caries endpoint in relation to sugars in natural teeth. *In situ* studies were only considered relevant when considering the affect of acid-containing drinks on dental erosion. The oral health review didn't note the importance of *in situ* studies they are only mentioned as background. That's why a broad statement is given regarding the *in situ* studies cited. The studies that refer to each aspect i.e. dose, fluoride and frequency against the relevant term have been cited.
Structure	PHE – Dental Public Health	On page 8 paragraph 1.8 of the main report there is a really useful summary of the main difficulties in measuring dietary exposure, it would be useful to repeat this in the Oral Health Evidence Review section.	SACN thanks the respondent for this comment, however the text of the oral health review cannot be changed now.
Infant feeding/ **breast feeding**	British Association for the study of Community	The systematic review reported two trials that looked at the effect of encouraging exclusive and prolonged breast feeding on the deciduous dentition (Feldens et al 2010) and mixed and permanent dentition (Kramer et al, 2007). The findings of these two studies have not been included in the main report. This would however be a useful statement of	SACN consider that the two studies highlighted by the respondent would be better placed in the complementary feeding review which is currently being taken forwards by the Subgroup on Maternal and

	Submitter	Comments	Action agreed by SACN
	Dentistry	findings and support the wider health benefits of breast feeding.	Child Nutrition. The remit of the Carbohydrates and Health report is to provide recommendations on carbohydrate intake from the age of 2 years.
	PHE – Dental Public Health	Infant feeding; the systematic review reported two trials that looked at the effect of encouraging exclusive and prolonged breast feeding on the deciduous dentition (Feldens et al 2010) and mixed and permanent dentition (Kramer et al, 2007). No increase in caries prevalence at follow was seen in either study. These findings are very useful as this is a question that is often raised in relation to decay in young children. It would be helpful if SACN could include these findings within the draft report.	SACN consider that the two studies highlighted by the respondent would be better placed in the complementary feeding review which is currently being taken forwards by the Subgroup on Maternal and Child Nutrition. The remit of the Carbohydrates and Health report is to provide recommendations on carbohydrate intake from the age of 2 years.
Omissions	Professors James & Sheiham	The SACN Report might also have highlighted that if any foodstuff commonly consumed were to cause ulceration of tissues in the gastro-intestinal tract, it would be banned. Yet it is extraordinary that the intake of sugars, that causes cavitation, is not considered a risk factor that needs the strongest controls to ensure that intakes are minimized.	Controls to limit the intake of sugars is outside of SACN's remit.
	PHE – Dental Public Health	In paragraph 4.16 there is a list of diseases affecting oral health which includes dental caries, periodontal disease and tooth wear- oral cancer should also be included within this list.	SACN thanked the respondent for highlighting this point. Oral cancer has been added to the list.
	UCL Dental Public Health Group	Oral diseases and dental caries in particular continue to be major public health problems in the UK. We therefore welcome the inclusion of oral health within the report. However some key points have been omitted from the oral health section on page 31. Oral diseases include a wide range of conditions including oral cancers. Point 4.16 therefore needs to be rephrased to clarify that the report is focusing on oral conditions	SACN thanked the respondent for highlighting these issues.

	Submitter	Comments	Action agreed by SACN
		directly affected by carbohydrates. The following points also need to be stressed: • oral diseases are largely preventable • social gradients exist for different oral health outcomes across the life course • adults and older people are retaining more natural teeth (levels of edentulousness have dropped significantly in recent decades) • dental caries can affect children, young people, adults and older people	
Role of fluorides and oral hygiene	Professors James & Sheiham	SACN do not explicitly deal with the issue that routine tooth brushing and repeated dental care cannot prevent the progressive increase in dental caries if so much free sugar is provided in the diet and in soft drinks (*see page 10 of full response for details*). Describes how fluoride is valuable in reducing and delaying sugar induced caries however the caries process continues if sugars consumption is not adequately controlled. We regret the SACN Report did not make the point that fluoride is not a substitute for drastically limiting sugars in the diet. Fluoride use still leaves a prevalence of sugar induced caries (page 11). Describes the burden of sugar induced caries despite efforts to prevent dental caries and the delaying effects with the very modest inhibitory value of the use of fluoride toothpastes (page 10).	This review considers the effect of carbohydrates on health including oral health. It is not practical to address all of the potential interactions with lifestyle and other health interventions on the wide range of diseases addressed in the review. The review specifically addresses the relationship between sugars and dental caries and makes recommendations on sugars consumption within the diet based, in part, on the increased risk of dental caries when sugars are consumed.
	Sugar nutrition UK	The draft report fails to recognise the importance of fluoride toothpaste in the prevention of dental caries. We question the likely impact of initiatives to reduce sugar intake to such low levels on dental caries, when the effect of fluoride is so significant (page 16).	The remit of the review did not include the relationship between fluoride consumption and dental caries. As a consequence this evidence was not considered and the working group is not able to draw conclusions about relative change of reduced sugars intake and fluoride consumption.

	Submitter	Comments	Action agreed by SACN
	UCL Dental Public Health Group	In the summary and conclusion section the important role of fluorides in caries prevention needs to be stressed and the point about 'oral hygiene and global preventative measures' needs to be rephrased or deleted (see pages 104-105 of draft review).	The review has not considered the evidence about fluoride in relation to dental caries so it would be inappropriate to make conclusions where the evidence has not been reviewed.
Polyols	Calorie Control Council	We agree with the finding in the SACN draft guidance that there is evidence that the use of products with polyols ("sugar alcohols") can be beneficial in the prevention of dental caries. We also agree that the use of chewing gum containing polyols in comparison with not using a chewing gum is beneficial to oral health.	SACN thanked the respondent for their comments.
	EPA	The benefits of polyols in oral health and in reduction of post-prandial glycaemic response is not mentioned We suggest adding a reference where appropriate (e.g. page 101) to the EFSA opinion on the substantiation of health claims related to the sugar replacers and maintenance of tooth mineralisation by decreasing tooth demineralisation and reduction of post-prandial glycaemic responses (EFSA Journal 2011;9(4):2076).	SACN agreed during the early stages of the review that variation in diet-induced acute PPG responses in healthy individuals (as opposed to glucose tolerance and insulin sensitivity, which are included) is not an established disease risk factor. Possible benefits of sustained reductions in the acute PPG effects of diets/foods are however reflected in lower GI/GL, and evidence for the health effects of these are evaluated in the report.
Dried fruit	Professor Wu	Describes the benefits of dried fruit especially plums and makes reference to Professor Wu's research into dried plums and oral health:- In conclusion, in addition to the proven overall health benefits, sweet-tasting dried plums may be a good alternative to candy or other sugary snacks for children as far as obesity and oral health are concerned."	SACN thanked the respondent for their comments.
Compari-	British	The WHO review states that "for the analysis relating dental caries in	SACN note that the mechanism for the

	Submitter	Comments	Action agreed by SACN
son with WHO report	Association for the study of Community Dentistry	adults, data were not downgraded for indirectness, although all cohort studies were conducted in children" because "the aetiology of dental caries is the same in children and adults". If SACN are taking a different view it should be made explicit and reasons given.	development of dental caries is the same for adults as it is for children. This is in line with the opinion of other dental health experts and reflected in the Moyniham and Kelly (2014)[2] systematic review conducted for WHO which is cited in the report. The recommendations have been amended to reflect that the conclusions on dental caries also apply to adults.
Support	Nutrition Society	Dental caries is still the biggest cause of hospital general anaesthetics for children in the UK, and is wholly preventable. Anything we can do to help usher in population level interventions, public policy, fiscal measures, advertising restrictions, etc the better. This is one step in the right direction.	SACN thanked the respondent for their comments.

Table 6: Carbohydrate recommendations

	Submitter	Comments	Action agreed by SACN
General comments on carbohyd-rate recommend ations	ASO	ASO largely agrees with the proposed population intakes. Given current population intakes, the recommendations will require a robust policy response, and as above, careful, consistent and clear communication of advice for the public. "Diet should be based on starchy foods, wholegrain where possible" This is a clear, straight-forward message and it is positive that pulses are also included.	SACN thanked respondents for their comments.
	British dietetic Association	"Diet should be based on starchy foods, wholegrain where possible" This is a clear, straight-forward message and it is positive that pulses are also included.	SACN thanked respondents for their comments
	NICE	NICE agrees with the proposed population intakes of carbohydrates.	SACN thanked respondents for their comments.
	Dr Magda Robinson, Obesity Managemen t Consultant	The recommended sources of carbohydrate should be widely promoted: wholegrains, beans and lentils, potatoes, vegetables and fruit.	SACN thanked respondents for their comments.
General DRV query / criticism	BNF	There is an emphasis in the report on the need to tackle obesity, which we wholeheartedly support, but it is unclear from the text how a reduction in the percentage of dietary energy derived from free sugars will result in lower dietary energy intake overall. Total carbohydrate intake is recommended to be at approximately 50% of energy intake; it is currently lower than this according to NDNS and so would probably need to rise. Indeed, to meet the suggested increased fibre recommendation this would probably need to be the case. On page 216, the SACN report states that 'the energy should be replaced with starches, sugars	The evidence assessed by SACN investigated the effect of free sugars on total energy intake. From this, it was concluded that higher sugars intakes raises a risk of higher energy intakes. Therefore the higher the consumption of sugars, the more likely people are to exceed the estimated average requirement (EAR) for energy. It has been made clear

	Submitter	Comments	Action agreed by SACN
		contained within the cellular structure of foods and in milk and milk products'. This wording suggests isocaloric replacement of free sugars but this is unlikely to influence body weight, which is one of the justifications given in the report for the focus on free sugars. Indeed, the calculation used in the report to derive the 5% value seems to imply no compensation of the approximately 100kcal saved. Clarification of this would be helpful.	in the report that if intakes of free sugars are lowered, the more likely it is that the EAR for energy will not be exceeded.
	FSAI	The formulation of Dietary Reference Values for carbohydrates is undertaken without considering other nutrients in the diet – particularly macronutrients. Therefore while the conclusions on ideal amounts of dietary carbohydrates for health may be well-founded, failure to consider the consequent effects of changing carbohydrate intakes on other nutrients, particularly fat and saturated fat, may result in dietary intakes that are more harmful. The Institute of Medicine (IOM) in their 2002-2005 report outline an approach to developing recommendations on macronutrient intakes that takes account of the inter-relationships that exist between macronutrients – particularly the reciprocal relationship between fats and carbohydrates (see Institute of Medicine 2002 – 2005 below).	The recommendation to reduce the consumption of free sugars is expected to reduce total energy intake. The respondent makes a good point; however, it is beyond the scope of the report to consider other macronutrients in the diet and would be for risk managers to consider.
Total carbohyd-rate DRV: support	BDA	It is proposed to maintain the current recommendation that 50% of the population's daily energy intake should come from carbohydrates" We would agree with this recommendation.	SACN thanked respondents for their comments.
	Dairy UK	With regards to the replacement of free sugars with starches, sugars contained within the cellular structure of food and in milk and milk products, Dairy UK welcomes this proposal as a sensible solution to achieving the carbohydrate recommendation of 50% of energy intake. Specifically with regards to dairy products, an increase in their consumption could result in at-risk groups achieving nutrient intakes	SACN thanked respondents for their comments.

	Submitter	Comments	Action agreed by SACN
		which they are currently falling short of.	
	Dr Madden & Dr Vafeiadou	Overall, we support the following recommendations: 50% energy from carbohydrate.	SACN thanked respondents for their comments.
	Dr Magda Robinson, Obesity Management Consultant	I also concur with the conclusion that carbohydrate should form no less than 50% of our diet.	SACN thanked respondents for their comments.
	Andrew Rugg-Gunn	I agree with the Recommendations (Paragraphs 12.24 to 12.33) that total carbohydrate should be maintained at about 50%E.	SACN thanked respondents for their comments.
Starch, intrinsic and milk sugar recommendations	Dr Buyken	The SACN recommendation that “the energy should be replaced with starches” carries a risk of substantially higher intakes of high starch/high glycaemic index foods, particularly in the absence of any recommendation regarding the choice of low glycaemic index foods.	SACN thanked the respondent for their comments.

Table 7: General comments

	Submitter	Comments	Action agreed by SACN
General comments in support of report	Action on Sugar	Action on Sugar welcomes the publication of the Scientific Advisory Committee on Nutrition (SACN) draft report on Carbohydrates and Health. The report, though a long time in coming, is very comprehensive in its consideration of the evidence, and we congratulate the authors on the transparent and robustness of the approach taken in their assessment of the evidence.	SACN thanked the respondent for their comments.
	ASO	The Association for the Study of Obesity (ASO) welcomes the update to the existing population recommendations on carbohydrates, particularly on fibre and free sugars, given new evidence. ASO considers the approach the committee has taken to the consideration to the evidence to be thorough and appropriate.	SACN thanked the respondent for their comments.
	British Dental Association	The BDA welcomes the detailed review by SACN and the inclusion of oral health as a key consideration.	SACN thanked the respondent for their comments.
	British Dietetic Association	The British Dietetic Association would like to offer sincere congratulations to the subcommittee of SACN, who have done an excellent job in compiling such a detailed and comprehensive review of the subject at hand. In particular, the methodical and transparent procedures and discussions of outcomes, deserves recognition and praise. This is a very useful update on the topic and will be an essential and valuable resource for all those working with nutrition, especially dieticians.	SACN thanked the respondent for their comments.
	BNF	In our comments we have focussed mainly on the recommendations of the draft report as presented on pages 216-17. The Foundation welcomes publication of the systematic literature reviews (SLRs) used to inform the proposals for the carbohydrate dietary reference values, which provide a useful and clearly presented summary of the body of evidence	SACN thanked the respondent for their comments.

	Submitter	Comments	Action agreed by SACN
		on carbohydrates and health. We congratulate SACN on the huge amount of work undertaken and the clear structure of the draft report, the helpful introductory chapters (1-4), the concise uniformly structured chapters summarising the findings of the review (5-10), and also the easy access to the supplementary information via the SACN website. The annexes are also useful, especially the data on current intakes from the NDNS (Annex 7).	
	BRC	Retailers welcome this thorough review of the scientific evidence on the current knowledge on the biological effects of different carbohydrates on health. We feel it provides objective and independent evidence which can guide future policy and company specific decisions. The format of the report makes it easy to find the association of a dietary components and risk factors or health outcomes. However it would be helpful to have a summary as a table in the final report.	The final report includes an executive summary, to summarise the key elements of the report.
	Dietitians in Obesity	We agree with the recommendations but have concerns about how they can be met by enough of the population to confer public health benefits.	Data from the National Diet and Nutrition Survey showed that a proportion of the UK population already met the proposed recommendations. Strategies to increase this proportion are beyond SACN's remit.
	Director of Public Health for Knowsley Metropolitan Borough Council	This is an extensive review of the evidence which highlights that view that eating a diet high in sugar is harmful to health and that drinking sugar-sweetened drinks should be minimised. […] I therefore strongly support the recommendations made in the report.	Data from the National Diet and Nutrition Survey showed that a proportion of the UK population already met the proposed recommendations. Strategies to increase this proportion are beyond SACN's remit.
	FDF	We welcome the thorough and transparent review of the evidence undertaken using the published SACN framework for the evaluation of	SACN thanked the respondent for their

	Submitter	Comments	Action agreed by SACN
		evidence (SACN 2012), and congratulate SACN on producing such a comprehensive report. We firmly believe public health policies should be underpinned by robust science and consider that it is important for government to commission reviews such as this so that nutrition policy continues to be based on the latest evidence. We believe similar rigour should be applied to the translation of the evidence to public policy recommendations.	comments.
	Food Active (Heart of Mersey)	The SACN report provides a thorough, systematic review of the current knowledge in terms of the biological effect of carbohydrates on health. The results show that a diet high in sugar is harmful for health, with many of the health consequences, including obesity, type 2 diabetes and dental decay, disproportionately affecting the more socially deprived. The report provides objective and independent evidence based on a large group of studies, which is of value for decision makers tasked with reducing sugar consumption and its associated health costs.	SACN thanked the respondent for their comments.
	FSAI	This report provides an excellent review of the role of dietary carbohydrates in cardio-metabolic health, colo-rectal health and oral health. The clarification of the complexity of dietary carbohydrates from the perspective of terminology, classification and definitions is very welcome and will be very useful. This report provides a transparent and detailed outline of the research considered and the strength of evidence for conclusions and recommendations.	SACN thanked the respondent for their comments.
	Grocery Manufacturers Association	GMA appreciates SACN's efforts to ensure their recommendations regarding carbohydrate intake reflect the current evidence base. GMA believes dietary guidance recommendations intended to inform policy development and public health interventions must be based on the totality	SACN thanked the respondent for their comments.

	Submitter	Comments	Action agreed by SACN
		of available scientific evidence.	
	MRC Human Nutrition Research	We have reviewed the draft SACN report for this consultation. The SACN report appears to be a very comprehensive review of the nutritional and health implications of carbohydrates and we welcome the review of the most recent evidence in this area.	SACN thanked the respondent for their comments.
	Nestle	We appreciate the robust and rigorous scientific approach taken by the SACN. In particular, and in light of the large number of diverse studies published in this field, we support the focus on prospective cohort studies and randomized control trials. In addition, we consider that the grading system adopted by SACN to be both science-based and transparent. We believe similar rigor should be applied to the translation of the evidence to public policy instruments and recommendations. We welcome the fact that the SACN has translated its scientific findings into dietary reference values for total carbohydrates, sugars and fibre.	SACN thanked the respondent for their comments.
	NICE	NICE welcomes the update to the existing population recommendations on carbohydrates, particularly on fibre and free sugars, given new evidence. NICE considers the approach the committee has taken to the consideration to the evidence to be appropriate and robust. NICE notes that the approach to the evidence is largely in line with NICE methodology.	SACN thanked the respondent for their comments.
	Nutrition Society	The report represents a major achievement in reviewing the literature in this area and highlights gaps in the evidence as well as differences in terminology between studies. A grid summarising the findings for different outcomes for different carbohydrate components showing limited/moderate evidence and whether a beneficial/detrimental effect) would be useful.	SACN thanked the respondent for their comments. SACN discussed this. However, the committee concluded that with such a large number of exposures and health outcomes a grid became large and unwieldy, and lost the important narrative

	Submitter	Comments	Action agreed by SACN
		A section on recommendations for future research would be valuable.	text in some of the boxes (e.g. on relevance). SACN therefore decided not to do this. Recommendations for future research initiatives are included in the final report.
	Nutrition Society	The comments re biomarkers for colorectal cancer (CRC) are well made. Studies on laxation are a good example of an end-point that can be measured following a short intervention and thus the data from RCTs in this area are some of the most trustworthy. There is the added advantage that this can be of immediate benefit to an individual. However, the point is well made that it is still uncertain whether this has any impact on more serious health outcomes such as CRC. The role of gut bacteria in the maintenance of colo-rectal health is currently a very active area of research. This is well reported in relevant tables throughout the document (e.g. table 6.4 and 9.27) and will hopefully at least produce better markers of risk to long-term health.	SACN thanked the respondent for their comments.
	Nutrition Society	This is a very comprehensive review of the evidence on carbohydrates and health taking which takes a somewhat cautious approach in its conclusions. It only considered evidence from prospective cohort studies and randomised controlled trials in contrast to the WHO draft guideline on sugars intake which I understand included non-randomised trials, population studies and cross-sectional studies (12.11) for its advice. This makes sense in view of the fact that the SACN report was looking at all carbohydrates and there was a need to limit the review and base it on the best evidence available – which in many cases was limited.	SACN thanked the respondent for their comments.
	Dr Robinson	It is vital that in an age where it is fashionable to demonise 'carbs', it is essential that there is a scientific stand that distinguishes 'bad carbs' (extrinsic sugars) from 'good carbs' (natural components of fibrous plant-	SACN thanked the respondent for their comments.

	Submitter	Comments	Action agreed by SACN
		based foods).	
	Professor Chris Seal	The report is a rigorous analysis of a substantial body of material; the approach is stringent and the results clearly presented.	SACN thanked the respondent for their comments.
	Sugar Nutrition UK	In particular, we welcome the level of transparency with which the data were compiled, and the way in which the evidence was assessed and graded using the SACN Framework for the Evaluation of Evidence (SACN, 2012). Specifically, we applaud the methodological section outlining the strength and quality of the evidence identified and the exclusion of ecological studies. We also welcome the distinction drawn between 'associations' of carbohydrates and health from observational cohort studies in contrast with cause and 'effect' evidence from controlled intervention trials. Furthermore, it is also acknowledged within this section where the evidence was deemed of insufficient quality on which to draw conclusions.	SACN thanked the respondent for their comments.
	UCL Dental Public Health Group	The review methodology is very comprehensive, systematic, detailed and balanced in nature.	SACN thanked the respondent for their comments.
	UK Health Forum	UK Health Forum (UKHF) welcomes the publication of the Scientific Advisory Committee on Nutrition (SACN) draft report on carbohydrates and health and the update and clarification it provides in the light of the latest evidence on existing population recommendations, particularly for intakes of dietary fibre and free sugars. UKHF judges the report to be very comprehensive in its consideration of the evidence, and that the approach taken by the committee in its assessment of the evidence appears to be robust.	SACN thanked the respondent for their comments.

	Submitter	Comments	Action agreed by SACN
	Unilever	It is a thorough review of the evidence and we commend all the work undertaken to produce such a comprehensive report. This will be an extremely valuable report which will provide the scientific basis for the development of sound public health policies and guidance for commercial product formulations.	SACN thanked the respondent for their comments.
	Which?	Which? welcomes the publication of the Scientific Advisory Committee on Nutrition (SACN) draft report on carbohydrates and health, following six years of work by the Committee's working group. We consider the report to be very comprehensive, with the quality of the evidence clearly explained. We welcome the clarification around advice on consumption of total carbohydrates and dietary fibre that the report provides. This needs to be widely disseminated given confusion about the role of carbohydrates.	SACN thanked the respondent for their comments.
	Ms Carol Williams and Dr Peter Watt	Overall, we strongly welcome the report as a much needed comprehensive re-assessment of the diet and health evidence around carbohydrates.	SACN thanked the respondent for their comments.
General comments in criticism of report	Action on Sugar	SACN relies heavily on the National Diet and Nutrition Survey (NDNS) data for intakes of sugars, data which, as stated in the report, highly underestimates actual intakes yet does not appear to take this into consideration in their final recommendations.	The report's recommendations for total carbohydrate, fibre and sugar intakes are based on assessing the evidence for relationships with health outcomes. In addition, much of the analysis and recommendations relates to %energy from sugars, and there is no evidence from NDNS to show that the % macronutrient composition is affected by the energy underreporting.

	Submitter	Comments	Action agreed by SACN
	Dr Winkler	SACN has substantially under-estimated current UK sugar consumption. In itself, that creates a false sense of security. But the under-estimate has additional unintended consequences. It provides an unrealistically low target for those who manage risks. An informed judgment on the scale of the problem would allow risk managers to make an informed political judgment on how best to deal with it.	The report's recommendations for total carbohydrate, fibre and sugar intakes are based on assessing the evidence for relationships with health outcomes. In addition, much of the analysis and recommendations relates to %energy from sugars, and there is no evidence from NDNS to show that the % macronutrient composition is affected by the energy underreporting.
	Dr Alexander	Although comprehensive in scope, there are concerns regarding the application of systematic methodology, and the development of evidence judgments that do not appear to be clearly supported by the evidence base. Specifically, the review methodology used to synthesize the evidence and formulate conclusions is not transparent in the SACN report. The methodological protocol is summarized comprehensively in the Cardiometabolic Health Protocol supporting document and the SACN Framework for Evaluation of Evidence document, but the application of analytical and interpretive methodologies for specific topic areas is somewhat unclear. Perhaps the foremost concern is the judgment of the evidence – because of the rather limited volume of studies, inconsistency of the data and methods across the studies, relatively weak associations, and the likelihood of bias (e.g., dietary recall, selection bias) and confounding (e.g., influence of other dietary and lifestyle factors) as acknowledged by SACN, the conclusions pertaining to sugar intake and health outcomes, particularly body composition and type 2 diabetes, appear to be overstated. A more cautious approach to interpreting the currently available evidence should be undertaken.	The methods for the systematic reviews and for judging the evidence were agreed before the evidence was considered and had been published. SACN considered the degree of caution exercised in interpreting the evidence to be appropriate.

	Submitter	Comments	Action agreed by SACN
	British Association for the Study of Community Dentistry	The detail within the report is useful however the report as it is currently organised is difficult to navigate and the research questions that it aims to answer are not made explicit. It would be helpful if the report was structured by research question, followed by a discussion of the evidence in relation to that question. A structure such as that used in a Cochrane systematic review would help to set out a clear research question, inclusion and exclusion criteria and methodology used, before outlining the potential influence of bias and confounding in each study. It would also have been useful to have a table summarising the quality and reliability of the studies. This would have made it easier to understand the evidence that was presented.	As the primary purpose of the report is to derive dietary recommendations, SACN decided that it was more logical to organise the material for this purpose, i.e. primarily by carbohydrate exposures. The methods for the systematic reviews and for judging the evidence were agreed before the evidence was considered and they have been published. SACN considered the degree of caution exercised in inclusion and exclusion and interpreting the evidence to be appropriate.
	BNF	We note, however, that some of the nuances of the SLRs and in Chapters 5-10 are not always carried through to the final two summary chapters. The SACN reports are hugely valued and widely used reference texts and for future users, who may not read the whole report, it would be helpful if the emphasis in the summary chapters could be consistent with that in the earlier parts of the report. In particular, it would be helpful if any food-based statements are put in context, e.g. the references to rice and potatoes on page 213 in the context of the strength of the evidence reported earlier in the report (and the caveats about reliance on prospective cohort data) and in the context of the recommendation to achieve around 50% of dietary energy intake as carbohydrate and the advice in Section 12.32.	The reviewed evidence had been considered as outlined by the grading system for judging the evidence (see Annex 2 of the report). A caveat regarding confounding by cooking variables e.g. frying is included in the report and the wording in relation to potato consumption and type 2 diabetes in the conclusion box below paragraph 7.22 has been modified. A caveat has also been included to clarify that the association between rice consumption and type 2 diabetes is largely derived from reported intakes that are substantially greater than typical current diets within the UK.

	Submitter	Comments	Action agreed by SACN
	British Soft Drinks Association	However, with respect to the proposed conclusions related to sugar sweetened beverages (SSBs), the Committee appears to have changed or not followed its own stated methodology for interpreting meta-analyses, [1]. In addition it has been suggested that placing undue emphasis on the results of meta-analyses despite recognised limitations and without appropriate emphasis on the entire body of relevant evidence can lead to discordant conclusions [2].	The recommendations for SSBs were based on the available evidence, and caveats had been added where appropriate.
	Professor Chris Seal	By limiting the evidence to cohort studies and RCTs much valuable observational data are lost and in many cases (as acknowledged in the report) this results in 'limited evidence' of effect even though this may be biologically relevant.	Observational data, other than from cohorts might have been included, however, SACN decided to base its judgement on cohort studies and RCTs.
	The Health Associates	The Health Associates welcome the launch of the consultation on the Scientific Advisory Committee on Nutrition's review of the evidence on carbohydrates and health. We acknowledge that, internationally, it is the most comprehensive review to have been completed for a number of years. Oral disease remains an important public health issue and it is therefore vital that we understand more about the development of such conditions so that we can improve population based strategies for prevention and treatment. We particularly welcome the use of systematic reviews to explore the evidence base, as these have the potential to provide a high quality basis for public health recommendations. The systematic review used as the basis of this report makes a welcome contribution to the body of evidence on the effect of sugars on oral health, which remains inconsistent in strength and to some extent, conflicting. Alongside this, the review highlights a lack of evidence to assess the impact of sugar intake on oral health in adults, as all included studies and trials were conducted in children and adolescents. This may have implications for future research initiatives.	Recommendations for future research initiatives are included in the final report.

	Submitter	Comments	Action agreed by SACN
	UCL Dental Public Health Group	The report is quite difficult to navigate. The executive summary will hopefully help to highlight the key points. It would also be useful for the systematic reviews to be accessible to readers interested in the detailed methodology.	The systematic reviews are available on the SACN website.
	Whitby Seafoods	Since the report was commissioned in 2008 there has been a great deal of public debate regarding sugar intake and its impact on health. Anyone reading the draft report is likely, like me, to be disappointed that the report does not give more information about sucrose consumption and its potential health risk. The committee have chosen to raise the bar high when it comes to evidence. No doubt the evidence regarding the health effects of sucrose consumption does not meet the committee's evidence criteria. But when it comes to health, as in many other things in life such as environmental protection, a lack of evidential certainty is not a reason for ignoring a potential risk. If there may be a risk, and a potentially serious risk, surely it should be mentioned and recommendations made on a precautionary basis. The front of the report should clearly show the names of the people on the working group committee responsible for the content. I had to search the SACN website to find that Dr David Mela Science Leader of Unilever R&D Vlaardingen, The Netherlands, is on the working group committee. This is of interest because Unilever are the world's second largest manufacturer of ice cream, and ice cream contains approximately 25% sugar.	Sucrose and its health effects were considered within the report's sections on individual and total sugars (chapter 6). As sucrose is the major component of free sugars intake, sucrose consumption was also addressed as part of the recommendation on free sugars intake. The names and affiliations of members of the Working Group and of the SACN main committee are stated in the final report.
General comments for considera-tion	FDF	In table 2.4 (SACN draft report, chapter 2, p19) the current DRV for total carbohydrates given is for food energy (carbohydrate: 47% total dietary energy, 50% food energy) whereas for NMES it is given for total dietary energy (NMES: 10% total dietary energy, 11% food energy). We would welcome consistency in the table as to which is being used, and if this is then carried through across the report when total dietary energy	SACN agreed the report should consistently refer to total energy. A statement has been added to clarify that the reference point throughout the report is total energy, while recognising that some people derive some of their energy intake

	Submitter	Comments	Action agreed by SACN
		recommendations are provided.	from alcohol.
	Fibre Consortium	We welcome SACN recognition that resistant starch is considered as dietary fibre on the basis of its capacity to increase faecal mass. However, there is also adequate evidence for an effect of resistant starch on reducing post-prandial glycaemia which is both beneficial with higher proportions of resistant starch and biologically relevant. It is noted that only fasting blood glucose concentrations have been evaluated as a health benefit in the report and post-prandial values, which are listed by SACN as a physiological benefit, have been excluded. We are therefore of the opinion that the report should include an effect of resistant starch on post-prandial glycaemia. […] Further, SACN's previous position statement on Dietary Fibre included reducing post-prandial glycaemia as a beneficial physiological effect (SACN 2008) (Section 1.2, para 6). *Please see full response for further details and references.*	SACN agreed during the early stages of the review that variation in diet-induced acute PPG responses in healthy individuals (as opposed to glucose tolerance and insulin sensitivity, which are included) is not an established disease risk factor. Possible benefits of sustained reductions in the acute PPG effects of diets/foods are however reflected in lower GI/GL, and evidence for the health effects of these are evaluated in the report.
	MRC Human Nutrition Research	[35.1] Ultimately the final report and recommendations will be important for a wider audience, such as policy makers, industry and health professionals. The highly detailed report is important and the tables outlining the differing international definitions are useful, but we wonder whether the key findings, definitions and recommendations could be summarised clearly in one short document, or section of the document. For example, it might be helpful if the report's summary recommendations made clear and explicit what the differences are between the old and new definitions of fibre and sugars. The only explicit statement of the difference between the NMES and free sugars that we could find was an asterisk under Table 2.2 (page 16), and it was not explicit in the recommendations at the end of the report.	The final report includes an executive summary, to summarise the key elements of the report.
	Nutrition	There is little or no comment with respect to pregnancy. I consider this to	The report includes an annex on

	Submitter	Comments	Action agreed by SACN
	Society	be an omission as advice to women in pregnancy is very varied. It should be made clearer from the outset of the report that pregnant women are excluded from consideration.	carbohydrate intake in pregnancy in relation to birth weight and cardiometabolic health outcomes.
	Nutrition Society	2) Much of the evidence supporting the recommendations is based on association between intake and outcome rather than effects seen from RCTs. The problems associated with conducting RCTs for disease prevention are well known and almost inevitably must use biomarkers of risk, the validity of which are also subject to debate. Is it acceptable that this level of uncertainty is not really conveyed in the overall recommendations? 3) The strength of the advice is reported to be upgraded by "Evidence from appropriately controlled experiments demonstrating one or more plausible and specific mechanisms in humans." (A2.21). It would be useful to add a bullet point to each table where a convincing mechanism has been identified as relevant in humans. This would help in the identification of areas where better mechanistic studies need to be undertaken. 4) All cohort studies are corrected for BMI except, I assume, those reporting on BMI as an end-point. Should this be made clearer in the summary document so that the message that being obese is detrimental to health is reinforced while at the same time highlighting that it is NOT a high proportion of carbohydrate in the diet that is a problem but just too much food. The evidence behind such a statement is supported and strengthened by the table at 5.121. This is key to counteracting so much misinformation available on-line.	2) SACN considers that the report's interpretation of the evidence judged the uncertainties appropriately. The report is not intended to convey an exhaustive description of the advantages and drawbacks of different research approaches, which are well-known to experts in the field. 3) Information on mechanisms was included in the beginning of the report and in sections where mechanistic evidence was used to support conclusions. For example, mechanisms were discussed in the context of gut bacteria and short chain fatty acid production, as well as in relation to dental caries. Mechanisms were recognised in deliberations and conclusions, and any upgrading was based on the evidence as described in the report. 4) A paragraph has been included in the report's conclusion to note that studies considered in the report were controlled for body mass index (BMI).
	Nutrition Society	I would like to congratulate you and the members of your group for putting such a comprehensive draft report together. I have enjoyed	

	Submitter	Comments	Action agreed by SACN
		reading the draft and appreciate having a reference point for updating my knowledge about nutrition, food, health and chemistry of foods to mention a few. [a] I would like to ask if adding a brief section on the relationship between cooking methods and domestic food processing and preservation and how they may affect the health outcomes considered by the report would add some value and be relevant to this report especially since dietary recommendations are also covered. [b] Secondly, the report does not appear, from my very quick read, to cover or make brief reference to the effect of physical activity / exercise on health outcomes such as constipation, bowel cancer, insulin resistance. For example how does exercise/physical activity affect gut motility and absorption of non-digestible carbohydrates. I feel that the relationship between level of activity and the metabolic process and resulting changes leading to disease, cure, prevention & control where relevant could add more weight to a very good report.	a] While the impact of food processing is an important consideration, most studies did not include the relevant information to allow this to be considered in the deliberation of recommendations. [b] In relation to physical activity, the report's conclusions are mostly based on studies in populations exhibiting the low to moderate physical activity levels typical of westernized countries. While this review's remit did not include physical activity, it was considered in SACN's recent report 'Dietary Reference Values for Energy'.
	Nutrition Society	[35.5] With regard to inclusion and exclusion criteria, including a table within the main text may facilitate the translation and enhance the readability. Similarly in paragraph 2.4 and with regard to sugars, a table can help clarifying the concept and facilitating the translation.	Information about inclusion and exclusion criteria for studies is provided in the systematic reviews, which are published. SACN did not consider it necessary to repeat that information in the report.
	Nutrition Society	[35.6] Chapters 5-10; boxes summarising the body of knowledge for each research question are quite informative. A statement to address the research question based on the information presented in tables can also be supplied to facilitate the translation.	Information about inclusion and exclusion criteria for studies is provided in the systematic reviews, which are published. SACN did not consider it necessary to repeat that information in the report.

	Submitter	Comments	Action agreed by SACN
	Nutrition Society	[35.7] The difficulty of disentangling carbohydrate intake and its effects from the rest of the diet is acknowledged but perhaps more of an issue is whether it is helpful to look at the effect of total carbohydrate intake given what we know of the variety and effects of the different compounds that are termed carbohydrates. The few effects reported for high carbohydrate diets per se cannot be taken in isolation from the other components of the diet but I suppose the chapter 5 (on total carbohydrates) is still required.	SACN thanked the respondent for their comment. However, SACN considers that this important point is adequately acknowledged and addressed where it arises in the report.
	Ocean Spray Cranberries Inc.	Our representation is a summary of pertinent issues for cranberry, with naturally unpalatable taste that would prevent consumers from benefiting from the demonstrated health benefits without some sweetening. To take account of these health benefits, we request that evidence relating to cranberry be reviewed by SACN and weighed fairly against any negative connotations that could be implied by the carbohydrate content vital to allow cranberry products to be consumed by the average consumer. We hope that by making this comparison SACN would recognize that some fruits, such as cranberry, unpalatable in their natural state, need added sweeteners and that a section or at the very least, a commentary be added to the draft Report that addresses this specific issue. *See full response for evidence presented*.	It is outside the review's remit to consider health effects of specific fruits, including cranberries.
	UK Health Forum	In the interests of transparency, we would welcome a statement in the final report that sets out how the Committee handled studies funded by or conducted by the food industry. This should be routine practice in reviews of this nature and would match the transparency provided by the World Health Organization in its 2014 Guideline.	Information on the funding of studies is noted in the systematic reviews. It would be inappropriate to downgrade evidence obtained from research simply because it is funded by industry without applying a similar sanction to research performed by individuals deriving personal or institutional income from books and lecture tours promoting their own views. The SACN approach was to note the funding source and to use professional

	Submitter	Comments	Action agreed by SACN
			judgement when considering the results presented.
	Ms Carol Williams and Dr Peter Watt	SACN's clear evidence-based recommendations on 'sugar' intake for prevention of obesity and type 2 Diabetes are also likely to assist in the non-pharmaceutical attempts to control glycaemic swings, body mass and long term aims for the treatment and health improvement of people with type 2 Diabetes. However, whilst expressing the recommendations as per cent energy automatically takes account of the intakes of sugar relative to total energy consumed by individuals, there is an important part of the energy balance equation missing, that of energy expended by individuals. Whilst we acknowledge the specific remit of the SACN was to look at carbohydrates and health, presentation of information from a single perspective tends to polarize the debate as to what aspects need to change to improve public health. As such the problem is often seen as eating too much of the wrong substances or not being sufficiently active, not as a mismatch between intake and expenditure. We suggest that a clear statement be included in the executive summary to this effect.	In relation to physical activity, SACN noted that the report's conclusions are mostly based on studies in populations exhibiting the low to moderate physical activity levels typical of westernized countries. Members clarified that the review's remit did not include physical activity, and that physical activity was considered in SACN's recent report Dietary Reference Values for Energy.
	Dr Madden and Dr Vafeiadou	It would be very helpful for practitioners and students if SACN were to publish a brief hard copy summary of the dietary reference values, i.e. to include 2011 energy and 2014 carbohydrate values in an updated version of the 1991 'grey book'. Large downloadable PDF documents are extremely useful but are not practical in many situations.	The final report includes an executive summary, to summarise the key elements of the report.
General comments for considera-tion: sugar	Calorie Control Council	[a] We would also like to note that classification of polydextrose as „Sugars, sugar alcohols, sugars-sweetened foods and beverages" (draft report Chapter 6 (page 82)) is incorrect. Polydextrose is a randomly linked glucose polymer that is non-sweet, resists digestion in the upper gastrointestinal tract eliciting a negligible glycaemic and insulinemic response and is partially fermented by the colonic microflora. To classify it with sugars or sugar alcohols is wholly inappropriate. It should be	[a] SACN thanked the respondent for pointing out that polydextrose had been misclassified; however this misclassification did not affect the systematic reviews or the considered evidence. The report's section on polydextrose has been moved to another

	Submitter	Comments	Action agreed by SACN
		classified under either dietary fibre (Chapter 8) or added to Chapter 9. [b] The report does not provide a differentiation of sugars on the basis of their metabolic fate and physiological response. Certain sugars such as fructose and isomaltulose strongly differ from sucrose because of differences in their digestion and absorption properties, although they are fully caloric. These differences have implications for health, which is reflected in the European Union (EU) register on nutrition and health claims (*see full response for further discussion*). As the report aims to evaluate the health effects of carbohydrates as a basis for public health policy, a chemical classification alone is not sufficient and a differentiation between sugars should be made on the basis of their physiological effects. [c] In the draft report, postprandial glycaemic response is not evaluated as a beneficial physiological effect *per se*. However, guidance by the European Food Safety Authority (EFSA) *does* include reduced postprandial glycaemic response as a health effect and as a potential basis for a health claim to be used to inform consumers. This has led to several new entries in the EU register on nutrition and health claims so far. Thus, we recommend the report be amended to include this important category.	chapter. [b] The report did consider the evidence on individual sugars. However, the evidence available in this area was limited. While individual sugars differ in some aspects of their metabolism, the report's risk assessment only considered outcomes with an established role in health. [c] SACN agreed during the early stages of the review that variation in diet-induced acute PPG responses in healthy individuals (vs glucose tolerance and insulin sensitivity, which were considered) is not an established disease risk factor. Possible benefits of sustained reductions in the acute PPG effects of diets/foods are however reflected in lower GI/GL, and evidence for the health effects of these are evaluated in the report.
	Nutrition Society	Terminology for sugars should be more clear e.g. in table 2.2 (page 16) as well as the verbatim definition it would be useful to have a grid showing all possible categories of sugars e.g. in whole fruit or vegetables, in milk/milk products, in dried fruit, added by manufacturer, cook or consumer, in honey, in fruit or vegetable juices, to show exactly what is included in each definition. If the term 'free sugars' is to be adopted in the UK it needs to be very clear whether the definition includes sugars in fruit purees added as sweeteners (as the manufacturer is adding fruit not sugars and they are not fruit concentrates) or in starch hydrolysates e.g. HFCS (which are not 'naturally occurring' and could be seen as excluded	Including a list of all possible categories of sugars and how they relate to the definition of 'free sugars' was beyond the scope of this report. However, in order to promote a consistent approach Public Health England will engage interested parties in developing and disseminating the definition and calculation of 'free sugars'.

	Submitter	Comments	Action agreed by SACN
		by 'sugars added by the manufacturer'). It is worth pointing out that none of the definitions in table 2.2 can be based on chemical analysis alone as in e.g. fruit yoghurt some sugars will be derived from whole fruit and/or milk and others from added sweeteners. The values for such foods have to be based on recipe calculations which are not always available. If research is to move forward, reliable values for added sugars will be needed: will manufacturers provide these on food labels? Will the new UK food tables provide values?	
	Professor Winkler	SACN underestimates current sugar consumption because it relies on NDNS data which is subject to under reporting (*see full response for further detail*). The nutrition gap is the distance between current intakes and desirable intakes. The wider the gap, the greater will be the actions needed to close it. The nutrition gap – that is, our national problem with excess sugar intake – is certainly much larger than currently estimated.	The report's recommendations for total carbohydrate, fibre and sugar intakes are not based on NDNS data. They are based on assessing the evidence for relationships with health outcomes. In addition, much of the analysis and recommendations relates to %energy from sugars, and there is no evidence from NDNS to show that the % macronutrient composition is affected by the energy underreporting. Consideration of the nutrition gap was outside the scope of the report.

Table 8: Specific comments on chapters 1-10 & 12 and appendices 1-5 & 7

Chapter	Submitter	Comments	Actions agreed by SACN
Ch. 1 Introduction and methods	Grocery Manufacturers Association	We request additional clarification and expansion of rationale for some inclusion and exclusion criteria used (such as 3yr follow-up for cohort studies, including only intervention trials that were a minimum of a year in length, and what is considered "the same period of time" for excluding cohort results in which a change in intake and change in outcome are reported).	SACN wanted to use evidence that showed a sustained effect of an intervention, rather than something that could be demonstrated within the context of a short clinical study which might not show sustained efficacy over a longer time-span.
	Nutrition Society	Limitations of cohort studies and RCTs (Paras 1.8 and 1.9, pages 8 and 9). Other limitations of cohort studies e.g. failure to control for other foods and nutrients which may affect the outcomes (e.g. failure to control for SSB intake in studies of white rice intake and type 2 diabetes or for sodium in relation to blood pressure as an outcome) and of RCTs e.g. the fact that they may have narrow inclusion criteria (e.g. age, health stratus, BMI), may use extreme levels of intake and are often short term. Many of these points are made in the later text but a comprehensive list here would be useful.	SACN thanked the respondent for their comments. SACN has highlighted some key issues that may arise, but did not feel it was necessary to try to produce a comprehensive list of every possible limitation or confounder that might occur in the evidence base, and these will already be known to expert readers.
Ch. 2 Classification, biochemistry, physiology	Calorie Control Council	Polyols should be recognised as carbohydrates, not sugars. Thus, we recommend Table 2.1 be amended to show polyols as a separate entry as stated in the 2003 FAO/WHO recommendation. Additionally, as noted in the 2003 recommendation the term "sugar alcohol" should be phased out and replaced with "polyol." We recommend that the term "sugar alcohol" be replaced with "polyol."	SACN thanked the respondent for highlighting these errors. Polyols have been included as a separate entry in table 2.1. The term 'sugar alcohol' has been replaced with 'polyol'.
	FDF	In section 2.38 (SACN draft report, chapter 2, p20) , the definition used with reference to the USA is not related to a definition for a whole grain food *per se*, but for a health claim for use with a whole grain food. This	The definition of whole grain the respondent refers to is not a definition SACN use or proposes it is simply an example to show the variation in meaning

Chapter	Submitter	Comments	Actions agreed by SACN
		can be found at http://www.fda.gov/Food/IngredientsPackagingLabeling/LabelingNutrition/ucm073639.htm We would recommend therefore, the other definitions provided in the report (HEALTHGRAIN and the AACC) are more relevant.	for the term “whole grain”. Paragraph 2.40 in the final report refers to differences in definitions of whole grain between countries within and outside the EU.
	MRC Human Nutrition Research	Should the definition of NMES (Table 2.2, page 16) be: “Sugars not contained within the cellular structure of a food ~~and~~, *except* sugars in milk and milk products”? Should paragraph 2.26 (page 16) be ‘endogenous’ not ‘indigenous’?	SACN thanked the respondent for highlighting these errors. The definition of NMES in table 2.2 has been replaced with the definition outlined by COMA 1991. ‘Indigenous’ has been replaced with ‘endogenous’.
	Nutrition Society	Terminology for sugars should be more clear e.g. in table 2.2 (page 16) as well as the verbatim definition it would be useful to have a grid showing all possible categories of sugars e.g. in whole fruit or vegetables, in milk/milk products, in dried fruit, added by manufacturer, cook or consumer, in honey, in fruit or vegetable juices, to show exactly what is included in each definition. If the term ‘free sugars’ is to be adopted in the UK it needs to be very clear whether the definition includes sugars in fruit purees added as sweeteners (as the manufacturer is adding fruit not sugars and they are not fruit concentrates) or in starch hydrolysates e.g. HFCS (which are not ‘naturally occurring’ and could be seen as excluded by ‘sugars added by the manufacturer’). It is worth pointing out that none of the definitions in table 2.2 can be based on chemical analysis alone as in e.g. fruit yoghurt some sugars will be derived from whole fruit and/or milk and others from added sweeteners. The values for such foods have to be based on recipe calculations which are not always available. If research is to move forward, reliable values for added sugars will be needed: will manufacturers provide these on food labels? Will the new UK food tables provide values?	SACN thanked the respondent for these comments. SACN feels the definitions are sufficiently clear for the purposes of defining exposures for risk assessment and recommendations. The report is not intended as a basis for product analysis, nor the specification, monitoring or enforcement of labels and claims.

Chapter	Submitter	Comments	Actions agreed by SACN
	Nutrition Society	Paragraph 2.6 page 11; referring to the difference to the Oligosaccharides in human milk, in what way? Difference in quality, quantity or type? Please clarify. Table 2.4 page 19; For UK, US, WHO and EU; the year of the reports should be added for the sake of clarification of the point of reference; esp. because the references are not included in this table.	SACN thanked the respondent for these comments. The respondent is referred to the cited and other papers for these details. The dates of the recommendations by various authorities have been added to the table.
	PHE - Dental Public Health	Fermentation of sugars in the oral cavity page 15 section 2.20 This section gives a good description of the production of acid from fermentable carbohydrate in the mouth and the ability of saliva to buffer acids. It would be useful to expand the importance of the demineralisation and remineralisation balance using the Stefan curve and to emphasise the scientific basis of the importance of frequency as well as amount with regard to dental caries. This could then be linked to chapter 6 where evidence for both frequency and amount of sugar containing foods and drinks is discussed.	A diagram of the Stephan curve has been included in the report.
	Sugar Nutrition UK	The energy intake section should distinguish between liquid and solid sources of sugars as there is evidence their compensation may differ (at least in the short term). *See full response for details (p11).*	SACN thanked the respondent for their comments which reinforce the recommendations on sugar-sweetened beverages. The studies and the review cited by the respondent largely refer to data from studies of single acute exposures; they do not meet the criterion for inclusion in this report. The majority of trials included in the report varied sugars in the diet through foods or a mix of foods and beverages, and although no formal comparison was carried out, these do not reveal a distinctly

<table>
<tr><th>Chapter</th><th>Submitter</th><th>Comments</th><th>Actions agreed by SACN</th></tr>
<tr><td></td><td></td><td></td><td>different pattern of outcomes from the studies using only beverages. Data from the latest NDNS reports that a third of adults (19-64 years) sugars intake is derived from beverages.</td></tr>
<tr><td></td><td>UCL Dental Public Health Group</td><td>It is factually incorrect to state that ‘natural sugars’ are present in virtually all meals. ‘Natural sugars’ is a confusing term and this point needs to be rephrased (see point 2.20 page 15 of draft review).

On pages 15 and 31 the text suggests that carbohydrates are cariogenic which is incorrect. Clarification is needed in the text on the role of free sugars in the caries process, rather than carbohydrates. (See points 2.20 and 4.14 pages 15 and 31 of draft review).</td><td>SACN thanked the respondent for highlighting these errors. The text in paragraph 2.20 has been amended to “naturally occurring sugars are present in many food constituents”. In paragraph 4.16 (rather than 4.14 as noted by the respondent) “Carbohydrate in the diet” has been replaced with “Sugars in the diet”.

Paragraph 2.20 does not mention carbohydrates rather sugars and specifically sucrose.</td></tr>
<tr><td></td><td>Ms Carol Williams and Dr Peter Watt</td><td>Table 2.2 page 16. Non –Milk extrinsic sugars does not include sugars in milk and milk products
<table><tr><td>Non-milk extrinsic sugars* – UK</td><td>Sugars not contained within the cellular structure of a food and sugars in milk and milk products.</td></tr><tr><td>Free sugars* – WHO</td><td>Sugars added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups fruit juices and fruit concentrates.</td></tr></table></td><td>SACN thanked the respondent for highlighting this error. The definition of NMES in table 2.2 has been replaced with the definition outlined by COMA 1991.</td></tr>
</table>

Chapter	Submitter	Comments	Actions agreed by SACN
Ch. 3 Dietary sources and intakes of carbohy-drates	Nutrition Society	In chapter 3 on the dietary sources and intakes of carbohydrates I do wonder why the NDNS was used as the major source of information on intakes. Given the level of underreporting in this survey it might be useful to report more results from the Family Food Surveys (from the Living Costs and Food Survey) which are carried out every year. However only the NDNS can give detail on the intakes of different age groups as Family Food is based on purchase data.	SACN thanked the respondent for their comments. However, SACN considers reporting dietary sources and intakes of carbohydrates from the National Diet and Nutrition Survey (NDNS) to be adequate.
	Nutrition Society	Paragraph 3.3 and with reference to broad category food level and detailed food group level, the explanation is not representative of the rigorous and strong methodological effort undertaken. Like all other nutrients considered in the NDNS and national surveys, the nutrient intake data have been presented in view of the nationally agreed 'Main and Subsidiary Food Groups' which are available as Appendix P at www.gov.uk. Thus, the wording of paragraph 3.3 is to be amended to refer to broad main food group levels and more detailed subsidiary food group levels as per NDNS methodology.	The analysis remains unchanged and an explanatory footnote has been added.
	Nutrition Society	Paragraphs 3.4 and 3.5 need to be supported by reference.	A reference for the NDNS has been included in paragraphs 3.4 and 3.5 of the report.
	Nutrition Society	Nationally representative surveys of the intake of sugars in children across Scotland commissioned by the Food Standards Agency Scotland which contain detailed analyses of intake of sugars and sugar-containing foods according to age sex and socio-economic deprivation should be mentioned.	SACN thanked the respondent for their comment. The narrative here is not intended to be exhaustive but rather set the general context of intakes in the UK.

Chapter	Submitter	Comments	Actions agreed by SACN
	Professor Rugg-Gunn	I share your concern regarding the high intake of NMES (Table 3.5, page 263) -- 15-16% of energy in 11-18 year olds. It should be noted that 35% of this high intake comes from 'soft drinks' and 'confectionery' (Table 3.17), both of which are marketed for frequent consumption.	SACN thanked the respondent for their comment which is covered in chapter 3 of the report.
Ch. 4 Background on health outcomes	Nutrition Society	In chapter 4 (Background on Health Outcomes) I was a bit confused as why lifestyle risk factors were not included in Table 4.1. Tobacco use, diet and physical activity are included in the comment on p 28 but not in the table.	Table 4.1 refers to markers and other outcomes potentially influenced by diet and therefore considered as outcomes in the risk assessment. Other non-modifiable and non-diet-related behaviours are noted as general background and factors that may be considered in the interpretation of studies with different populations.
	PHE – Dental Public Health	4.18 dental caries data is quoted for 2003 from the NCDHS. There is more recent data available for England, recently published by PHE and already referenced within the report as Public Health England (2013).	SACN thanked the respondent for highlighting more up to date data on dental carries in children. The reference has been changed to Public Health England 2013.
	Professor Rugg-Gunn	Dental caries remains a disease of medical, social and economic importance (Marcenes W *et al.* J Dent Res 2013;92:592-7). I agree with the statistics presented in Paragraphs 4.14 to 4.18. In addition, extraction of carious teeth is a major cause of hospital admissions of young children in the UK (Elmer TB *et al.* BDJ 2014;216:248): this is both expensive and a negative experience for child and family.	The following sentence has been added to paragraph 4.18, “Extraction of carious teeth is the most common cause for hospital admission for young children in the UK. (Elmer *et al* 2014)”
Ch. 5 Total carbohyd-rates	Nutrition Society	Body weight or BMI as an outcome: it is not always clear whether it is the change in weight or BMI or just the value at the follow up in a cohort study e.g. the heading above para 5.114 is ‘body weight change’ but the box under para 5.116 says ‘body weight’.	SACN thanked the respondent for their comments. It is change in weight or BMI that is reported.

Chapter	Submitter	Comments	Actions agreed by SACN
	Nutrition Society	For studies with energy intake as an outcome it is important to know that these are studies where participants could chose most of their diet ad libitum, e.g. paras. 5.135-6 and particularly the studies used in fig 1 p.202.	SACN thanked the respondent for their comments. In all studies with energy intake as an outcome *ad libitum* intake was possible.
Ch. 6 Sugars, sugar-sweetened foods & beverages	Dr Alexander	It is not clear if this is yet to be provided or if the SACN draft report is referring to: Update Search, Evidence tables updating the systematic reviews on cardio-metabolic health, colorectal health & oral health from the supporting documents. The SACN draft report in its current form provides no scientific perspective on the specific methodology used to evaluate topic areas. In the SACN draft report it is stated that, "Evidence on health/disease outcomes have been discussed in detail only where there are sufficient data for a conclusion to be drawn, from studies meeting the pre-agreed inclusion criteria" (6.2, pg. 82). The report does not contain detailed discussions or reviews for any topic area. Each sugar-outcome topic area is summarized in an insufficiently brief paragraph that includes the number of studies and minimal characteristics. There is no evidence on the review process for each of the topic areas, no discussion of study quality, no discussion on how the studies were evaluated quantitatively, and no discussion of how the evidence was judged. Some additional information is provided in the supportive documents but it is unclear how the totality of the evidence was synthesized to formulate conclusions.	The descriptions of included studies and information on how the totality of evidence was synthesised to formulate conclusions is contained within the reviews themselves and are too detailed to be included in the report. All the reviews are available on the SACN website https://www.gov.uk/government/groups/scientific-advisory-committee-on-nutrition
	British Association for the study of Community Dentistry	Within the report there are conflicting statements with regard to evidence on frequency of sugar intake in the mixed and permanent dentition between paragraphs 6.61/6.62, this may cause issues when trying to give advice on frequency of intake. In the summary and conclusions to chapter 6 the report states that there is a lack of data on adults, this should be stated earlier in the document.	SACN does not see the conflict referred to by the respondent. Paragraph 6.61 states the number of relevant studies identified, and paragraph 6.62 describes the findings of the studies.

Chapter	Submitter	Comments	Actions agreed by SACN
	British Dietetic Association	We were somewhat surprised that only one randomised controlled trial (de Ruyter et al, 2012) was cited to evidence the effects of sugar-sweetened beverages on risk of weight gain in children. The two other studies cited (James, 2007; Ebbeling, 2012) report no differences in weight gain in children in relation to sugar-sweetened beverages.	The rational for this is clearly explained in paragraphs 6.48-6.51 of the finalised report. The 1 year data from Ebbeling et al. (2012) support the same effect; however the 2 year data were doubted due to compliance. The study by James et al. (2007) was not a pure sugar exposure and did not represent a direct test of sugars sweetened beverages. The evidence based on de Ruyter et al. (2012) was upgraded in accordance with criteria in SACN guidelines for (up)grading of evidence.
	BNF	In Sections 6.33 and 6.34 of the SACN report (pages 89-90), it is not clear whether the meta-analysis reported is one conducted as part of SACN's review or is from the Greenwood paper (we have only accessed the abstract of the latter but the RR and CIs appear different). This is also an example of where the nuance of the text in the supporting information (p140 of Chapter 4 on diabetes) is not carried through into the text in the draft report (Chapter 6) or the concluding chapters. As the evidence reported is the basis of one of SACN's recommendations, we suggest that consideration is given to adding a little more context, to assist interpretation.	The meta-analysis values now reported in paragraph 6.37 are taken from Greenwood et al. (2014). The text in paragraph 6.36 has been amended to make this clear. The RR and I^2 now stated in the report are derived from an analysis which excludes one study (Paynter et al., 2006) on the basis that it was the only one to include fruit juices as sugars sweetened beverages. Removal of this study brings I^2 down from 85% to 65%. Thus SACN's conclusions are only for "sugar-sweetened soft drinks". This has been acknowledged in the text. It is not clear what 'nuance' the respondent is referring to with regard to chapter 4, page 140.

Chapter	Submitter	Comments	Actions agreed by SACN
	Fibre Consortium	We note that the draft report incorrectly includes polydextrose under 'Sugars, sugar alcohols, sugars-sweetened foods and beverages', which is misleading and could mean that relevant studies may not have been picked up. *See full response Annex-4 pages 1 and 2 for a description of polydextrose.* For polydextrose, under the heading "colo-rectal health", reference is made in relation to faecal bacterial content, including 4 studies (Jie et al., 2000; Hengst et al., 2008; Boler et al., 2011; Costabile et al., 2012). We would like to point out that the correct reference to the first author of the third publication should be Vester-Boler et al., 2011. It was concluded that no effect exists between polydextrose and faecal bacterial content, based upon moderate evidence. Several other studies on polydextrose and the effect on faecal microbiota have been published, which are not included in the SACN draft report. (References not provided). It is not clear if increased faecal bacterial content in general, or selective increased faecal bacterial content, is regarded as a beneficial effect, indicating increased colonic fermentation. In the SACN draft report, it is stated that whether the effect on faecal bacteria is beneficial and of biological relevance is currently unclear. In the document on the Systematic review of evidence: carbohydrate and colo-rectal health, faecal bacteria is included as a colorectal health endpoint for a normal colorectal function. It is further not clear why, if faecal microbiota are not regarded as something (potentially) beneficial, why the evaluation and inclusion thereof in relation to several fibre-type ingredients is relevant to the SACN draft report on carbohydrates and health. Similar comments can be made for faecal pH and short chain fatty acid content. In this regard, it has to be mentioned that faecal pH and SCFA content are not necessarily representative for a colonic condition, as clearly recognized by Health Canada which gave a positive opinion on polydextrose as a dietary fibre. In this case, in-vitro and animal data could provide useful	SACN thanked the respondent for highlighting this error. Polydextrose has been moved to chapter 9 Non-digestible oligosaccharides and resistant starch. The classification of polydextrose did not affect the systematic search or the considered evidence. The reference has been amended to Vester Boler et al., 2011. With regard to faecal bacteria the report was initiated in 2008, when SACN considered that effects and associations related to microbiota might achieve more strongly endorsed cause-effect relationships with health-relevant outcomes for the host. SACN's judgement in 2014 was that this was not yet convincingly achieved, and therefore retain the view expressed in the report that '…whether specific effects are beneficial and of biological relevance is currently unclear'.

Chapter	Submitter	Comments	Actions agreed by SACN
		information to support increased saccharolytic colonic fermentation. We seek clarification why an evaluation of polydextrose in relation to increased faecal bulking has not been included in the SACN draft report.	Evaluation of polydextrose in relation to faecal weight has been included in the report.
	PHE – Dental Public Health	In paragraphs 6.65, 6.66 the review states that overall the reported associations between the frequency of sweet intake and risk of caries in deciduous dentition were less consistent with limited evidence but the direction of the association between the greater consumption of sugars-containing foods and or/sugars confectionary is detrimental to oral health. However, as has been stated earlier in this response; differences in the structure of the supporting information in the systematic review and the main report findings and evidence used to support statements make the report findings difficult to interpret. In 6.69, 6.70 the review states that there is moderate evidence that using a chewing gum containing sugar alcohols in comparison with not using a chewing gum has beneficial effects for oral health (both mixed and permanent dentition). However it is not clear whether this effect is due to the sugar alcohols or the chewing effect increasing salivary flow. It is of practical relevance to know about the frequency with which gum has to be chewed to be able to exert a beneficial effect. Frequency of chewing is mentioned in the various paragraphs about the relevant trials but the summary (6.78) does not refer to this key feature. No statement is made regarding risk of bias. There are a number of statements around both amount and frequency of “sugars”, “sugar-containing foods” and “sugar-containing beverages”. This seems to be related to how individual studies have measured exposure. This is confusing when there are conflicting statements regarding evidence on frequency of sugar intake in the mixed and permanent dentition. To provide a clear format that relates to relevant public health messages, it may be more helpful to summarise the main research questions relating to sugar and dental caries (*see page 4 of full*	The report was compiled from the systematic review and as the primary purpose of the report is to derive dietary recommendations, SACN decided that it was more logical to organise the material for this purpose primarily by carbohydrate exposure. SACN thanked the respondent for their comments but considered that the text did not need amending. SACN thanked the respondent for their comment but considered that the format of the report did not need amending.

Chapter	Submitter	Comments	Actions agreed by SACN
		response for specifics) Clarity required between overall report and oral health evidence review (*see table on page 6 of full response for the specifics*).	The inclusion criteria for the oral health review stipulated that data had to be controlled for brushing. Evidence considered in the report (the narrative review) (i.e. Campain et al., 2003) did not.
	Professor Rugg-Gunn	I agree with the summaries and conclusions of evidence given in Paragraphs 6.59 to 6.70, 6.77 to 6.79, and 12.9. Had the review of evidence included all published studies on dietary sugars and dental caries, including animal studies, laboratory studies and human ecological studies, the evidence base for concluding that dietary sugars are the major cause of dental caries would have been much stronger: all types of study point in the same direction. It should be noted that in free-living populations there is a close correlation (+0.77) between frequency of intake and weight of intake of high sugar foods. Both are important, and the failure to record significant associations between frequency of intake of sugars and dental caries (Paragraph 6.62) is likely to be because (a) frequency is a difficult variable to record and therefore subject to error, and (b) frequency is a discrete variable with the attendant difficulties of recording statistically significant correlations as you have indicated in your reference to Appleton *et al.* 1986.	SACN thanked the respondent for their comments.
	Sugar Nutrition UK	The Carbohydrates and Oral Health review notes that “evidence linking the development of dental caries to sugars consumption is relatively weak.” (p.46; paragraph 132) while the draft Report suggests there is “moderate evidence”. The draft Report notes “moderate evidence” for an association between the amount of sugar consumed and dental caries. Of the five studies identified two report the same cohort study (Rugg-Gunn et al., 1984,	The evidence from the systematic review was qualitatively described as ‘relatively weak’; however the relationship was further supported by data in both strength and direction from the narrative review sufficient for grading this as ‘moderate’, consistent with criteria in SACN guidelines

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		Rugg-Gunn et al., 1987) and another did not adjust for tooth brushing (Campain et al., 2003), leaving three cohort studies on which to form an opinion. It is proposed that that the association is downgraded to "limited", to comply with SACN criteria.	for (up)grading of evidence.
	Sugar Nutrition UK	Of the two studies excluded from the analysis for sucrose, (paragraph 6.27, p88), one was in relation to missing confidence intervals (Colditz *et al*., 1992), yet its non-significant RR of 1.16 was reported within the draft Report (p88). We would ask for this to be clarified, given that the CI cited within the results section of the paper (Table 1.0) show no association with risk for type 2 diabetes: RR (95% CI) for highest vs lowest quintile of sucrose intake (BMI<29) 1.16 (0.77–1.76) (p=0.76) and (BMI ≥29) 0.90 (0.64–1.28) (p=0.20).	The study by Colditz et al., 1992 could not be included in the meta-analysis because the confidence intervals around each relative risk for each quintile are required to calculate a dose-response. Only the overall confidence interval was included in the paper. Additionally in this paper the intake ranges for each quintile were not reported.
	UCL Dental Public Health Group	The text in points 6.61 and 6.62 are confusing and appear to contradict what is stated in section 6.67. (see point 6.61 and 6.62 pages 97-98 of draft review)	The reported source of the sugars is different between paragraphs 6.61-6.62 and 6.67. The studies in paragraphs 6.61-6.62 simply report on sugars frequency whilst those in paragraph 6.67 report on sugars-containing foods consumption. The two sets of data draw different conclusions with sugars-containing foods consumption showing a significant association while frequency of sugars consumption *per se* does not.
Ch. 7 Starch and starch-rich foods	APRE	The SACN reviewed hundreds of studies that examine the association and/or effect of carbohydrates and carbohydrate-containing foods on various markers and health outcomes, including cardiovascular disease, type 2 diabetes mellitus, obesity and colorectal health. The findings, in general, are striking in that there is little to no effect or association between these health outcomes and consumption of carbohydrates	

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		and/or high-carbohydrate diets (*see Appendix of full response, Tables 1-4*). Of the few health outcomes that do show an effect or an association, the committee proposes a measured summary statement with sufficient caveats to fully explain the body of evidence. It, therefore, defies explanation for the very strong statement proposed by the committee concluding that greater consumption of potatoes "*is detrimental to health*" proposed in the type 2 diabetes section 7.21 and 7.22, pages 110-111. Based on the limited body of evidence, inconsistent results, weak or no associations, high degree of heterogeneity, this statement is overly broad, inaccurate on its face and misrepresents the strength, totality and preponderance of the available science on this topic (*see full response, Appendix, Table 5*). This proposed statement is overly broad because all health outcomes were not examined. First, there appear to be no RCTs examining potatoes and any health outcomes. Second, of the health outcomes that were examined – cardiovascular disease, obesity and colorectal cancer and type 2 diabetes mellitus – the body of evidence is limited to a few cohort studies that exhibit a high degree of heterogeneity; show no consistent results; and cannot show a cause-and-effect relationship. For example, there is no association and limited evidence between potato consumption and cardiovascular disease. There is insufficient evidence on the relationship between potato consumption and stroke, impaired glucose tolerance, glycaemia and coronary events. Finally, the few cohort studies examining total cardiovascular disease and potatoes are inconsistent. *See full response for detailed critique of cohort studies*. The small number of cohort studies, inconsistent results, weak associations, implausible estimates of relative risk based on low consumption of French fried potatoes, in particular, and potatoes, in general, do not support the statement proposed by the SACN with regard to risk of developing type 2 diabetes or any other adverse health	This statement is taken out of context as it is modified by "but it is not possible to exclude confounding by other variables e.g.cooking methods such as frying". The report also says there is limited evidence for the association.

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		outcome. In summary, APRE requests that the SACN consider the following: 1. The entire body of evidence related to any health outcome and specific to potato consumption is insufficient to draw any conclusions; 2. The cohort studies examining potato consumption and total cardiovascular disease events finds no association from the limited evidence available; 3. There were no reported studies that met the inclusion criteria specific to potato consumption and obesity or colorectal health; 4. The cohort studies relating greater potato consumption and type 2 diabetes mellitus are limited and the strength of the association is weak and not specific to potatoes; 5. The few cohort studies that are available on type 2 diabetes mellitus and greater potato consumption are inconsistent, have weak associations, were not properly controlled for weight gain over time and cannot show a cause-and-effect relationship; 6. The cohort studies are subject to confounding with other foods and food groups that may be consumed with potatoes, including fried potatoes. APRE commends the efforts of the SACN, however, the proposed statement regarding the association between greater potato consumption and health is not justified scientifically by the insufficient size of the body of evidence, the weakness of the association, the type of studies available (cohort only), misspecified or under-specified statistical models and in some cases, hypothetical and implausible consumption patterns related to potato and French fried potato consumption.	
	Potato Council	Given the report's findings in terms of positivity towards the fibre content and overall health benefits of consumption of potatoes, coupled with the	SACN thanked the respondent for highlighting this inconsistency. Potatoes

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		recommended increase of the NRV of fibre to 30g (AOAC) and the recommendation that 50% of the nation's diet should comprise of all carbohydrates, it was concerning to read, amongst others, the statement made on page 111, paragraph 7.2, "The direction of association indicates that greater consumption of potatoes is detrimental to health". There appears to be an inconsistency in that T2DM and potatoes in table 7.1 have been included (indicating insufficient evidence, i.e. 'too few studies or trials that meet the inclusion criteria') but evidence for four studies earlier in the chapter have been reviewed (sections 7.21 and 7.22), suggesting there was sufficient evidence (albeit described as 'limited') to justify consideration of these studies. There is equally reference throughout the cohort studies that increasing consumption of potatoes is associated with an increase in the incident of cardiovascular disease which is also of concern. For example, table 7.3 states that there is inconsistent evidence for the role of potatoes in CVD. We would ask you to review the consistency of the statements surrounding potatoes and T2DM and CVD and offer some clarity over the apparently conflicting language and presentation of the evidence base. Perhaps section 7.26 could be modified to make it clear that the association with T2DM is borderline and consider adding a summary sentence within the report and conclusions section on page 113 that interprets the findings in the context of the recognised limitations of cohort data and the recommendation to consume about 50% of energy as carbohydrate, Certainly in chapter 12 section 12.32 potatoes are referred to in a very positive light and for consistency it would be helpful if this were also reflected in 12.15 and in the conclusions for chapter 7.	have been removed from the insufficient evidence category for type 2 diabetes mellitus in table 7.1.
	Professor Rugg-Gunn	The lack of evidence regarding the relation between dietary starch and dental caries is noted (Paragraphs 7.24, 12.13). Three case-control studies of people with inborn errors of sugar metabolism (hereditary fructose intolerance, sucrase-isomaltase deficiency) show virtual absence of caries in these people who avoid sugars despite similar (or raised)	SACN thanked the respondent for highlighting these studies; however the data are either not acceptable as evidence in this context (i.e. ecological studies) or

Chapter	Submitter	Comments	Actions agreed by SACN
		starch intakes. Many ecological studies point to the same conclusion (Rugg-Gunn AJ *Nutrition and Dental Health* OUP 1993). In the one study to simultaneously record sugars and starch intake (Rugg-Gunn *et al.* 1987; quoted by you), sugars intake was significantly positively related to caries increment while starch intake was weakly negatively related to caries increment.	are not in “normal” populations.
Ch. 8 Dietary fibre	Dr Madden and Dr Vafeiadou	We note the lack of evidence of the effect of resistance starch on mineral absorption (Table 9.1). We cannot find other comment on the effect of dietary fibre on mineral absorption and raise the question about whether this should be considered in view of the recommended increase in fibre.	The evidence on resistant starch and mineral absorption is lacking, therefore it is not possible to consider this in relation to setting the fibre DRV. It is noted in paragraphs 9.35 and 9.69 that there is reason to expect possible beneficial effects on calcium absorption from increased colonic fermentation.
	Nutrition Society	Paragraph 8.121 page 146 last sentence is not clear. Paragraph 8.125 page 147 box states ‘whole grains’ but should be ‘cereals’.	SACN thanked the respondent for their comments. The text in the paragraph highlighted by the respondent has been amended. In the conclusion box relating to total cereals and cardiovascular disease the third bullet point has been amended.
Ch. 9 Non digestible oligosacch-arides and resistant starch	Clasado	The respondent notes that different GOS preparations are produced through different manufacturing methods (using different enzymes) and therefore differ in their composition and physiological effects. The various GOS preparations should therefore be considered as separate products, rather than being considered in aggregate. *See full response for further details.*	It is expected that the various preparations of galacto-oligosaccharides would result in different physiological effects; however there is limited evidence for any defined type and often papers do not provide enough specification. The text in the oligosaccharide section of the report has been amended to reflect that any reported

Chapter	Submitter	Comments	Actions agreed by SACN
			physiological effects are highly dependent on the specific defined material. SACN thanked the respondent for highlighting that bifidogenic effects were observed at doses <8 g. SACN was unable to see where Silk et al 2009 was described as 'single blinded'. Text in the conclusion box on galacto-oligosaccharide and faecal bacteria has been amended to say that there is effect at doses of 2.4 to 14.4 g/day, dependent on the specific, defined GOS source. The text in the summary and conclusions in chapter 9 has been amended.
	Fibre Consortium	The evidence for an effect of resistant starch on post-prandial glycaemia was not reviewed, despite there being numerous studies which address this research question. This omission is surprising since this evidence was recently reviewed by EFSA. *See annex 2 of full response for specific comments*.	SACN agreed during the early stages of the review that variation in diet-induced acute PPG responses in healthy individuals is not an established disease risk factor. Possible benefits of sustained reductions in the acute PPG effects of diets/foods are however reflected in lower GI/GL, and evidence for the health effects of these are evaluated in the report.
Ch. 12. Summary and conclusions	BNF	Another aspect that seems inconsistent and would benefit from clarification concerns text in Section 6.76 on page 105 of the report which states: 'A greater risk of developing type 2 diabetes mellitus, however, is associated with the consumption of sugars-sweetened beverages in cohort studies, but there are too few trials on glycaemia, insulinaemia and insulin resistance to draw firm conclusions with regard to sugars-	Paragraph 12.9 was a summary of areas where a risk was identified, paragraph 6.76 also included a statement for exposures where a risk was not identified.

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		sweetened beverage intake.' Yet Section 12.9 on page 211, referring to diabetes risk in adults, simply states that '…. A greater risk is associated with a higher intake of sugars-sweetened beverages', without reference to the second part of the previous statement. It might also assist those reading Chapter 12 if it were clearer which parts of the evidence on beverages stem from studies in children and which from studies in adults.	
	Nutrition Society	Para 12.10 page 212 implies that the studies were designed to look at the effects of increasing sugars intake from existing values whereas I suspect the opposite was true: the former might not be approved by an ethics committee.	SACN thanked the respondent for their comments. The text in the report has been amended.
	Whitby Seafoods	On page 212, para 12.11 the report briefly mentions the very significant decision by the WHO to publish revised draft guidelines for sugar intake. This is surely an extremely important development and deserves more consideration. The final sentence of that paragraph states *"It should be noted that WHO's draft recommendations to limit sugar consumption are based on evidence for reducing the risk of dental caries."* That statement is true but in my opinion is partial, because the WHO's recommendations are associated with health concerns beyond dental caries. The committee should amend the draft report to give more weight and balanced comment on the WHO concerns.	SACN based its recommendations for free sugars intake on a different evidence base than the WHO. The WHO recommendation that no more than 10% of energy should come from free sugars is based on evidence on tooth decay and that additional benefit would be obtained if this was lowered to 5% of energy. The WHO developed its advice to consume no more than 5% of energy from free sugars based on three population studies looking at sugar supply and the rates of tooth decay in Japan. However, SACN based its recommendations on studies looking at sugar consumption and calorie intake in free living people. This was further informed by studies on tooth decay, type 2 diabetes and weight gain in children/adolescents.

Chapter	Submitter	Comments	Actions agreed by SACN
Annex 1. Systematic reviews	David Chong Kwan	I am not convinced that your conclusion that the link between dental caries and sugar consumption being weak In supporting document, "carbohydrates and oral health", cannot come from a comprehensive review of the literature. I suggest you contact the BDA and ask for a review of the literature from EBD. Has a dental public health consultant been involved in the steering of this report? Caries is still the commonest cause of hospital GA in the UK. Perhaps some involvement from the dental profession should be sought.	The evidence from the systematic review was qualitatively described as 'relatively weak'; however the relationship was further supported by data in both strength and direction from the narrative review sufficient for grading this as 'moderate', consistent with criteria in SACN guidelines for (up)grading of evidence.
	PHE – Dental Public Health	The section relating to the mixed and permanent dentition opens with "Four cohort studies..." The ensuing discussion relates to cohort studies, until p38 Para 98, there is a confusing discussion of a trial relating to the deciduous dentition (Frostel et al., 1991). This may have been placed in the wrong section.	SACN thanked the respondent for highlighting this error. The text has been amended.
Annex 2. Review methodol-ogy	PHE – Dental Public Health	A2.3 Page 220 tooth wear (including tooth loss) should be (including dental erosion)	SACN thanked the respondent for highlighting this error. 'Tooth wear (including tooth loss)' has been replaced with 'tooth wear (including dental erosion).'
Annex 3. Comment-ary on fructose and health	Nutrition Society	Para A3.3 page 226 5th line does not make sense.	SACN thanked the respondent for their comment. The text has been amended.
	Sugar Nutrition UK	<u>The terminology used in discussion of the effect of fructose on health needs clarification.</u> In Annex 3, the SACN draft Report refers to "…HFCS, also known as isoglucose…" This statement is incorrect and we therefore seek clarification. HFCS contains 55% fructose, while isoglucose contains 42%	SACN thanked the respondent for highlighting this error. The text has been amended.

Chapter	Submitter	Comments	Actions agreed by SACN
		fructose. In Europe, HFCS would be declared as 'fructose, glucose syrup', whereas isoglucose would be declared as 'glucose, fructose syrup' – that is, they are different materials. We would ask for this to be corrected in Annex 3 and elsewhere in the draft Report.	
Annex 4. Dietary acids and tooth wear	PHE – Dental Public Health	Terminology used is confusing for example 'corrosion' used e.g. in Annex 4. Dietary acids and tooth wear, A4.5 and also in the introduction to chapter 6.	In terms of wear mechanics the acid dissolution of tooth is corrosion; however (and as stated in the review) this is universally referred to as erosion in dental literature.

Table 9: Additional evidence and recommendations for future research

	Submitter	Comments	Action agreed by SACN
Additional evidence provided	Action on Sugar	Additionally, new evidence published since the SACN report we would like to see appraised includes: New evidence from Te Morenga *et* al has emerged on the role of free sugars in inducing blood pressure and other cardiovascular risk factors when body weight is stable1. New analyses of the relationship between free sugar intakes and dental caries from Sheiham and James suggest that 5% free sugars should be the absolutely upper limit for individuals, with population averages of 2-3% or less.	SACN thanked the respondent for highlighting these additional studies. Te Morenga et al. 2014 has been acknowledged in the final report. The author's inclusion criteria are very different from the cardiometabolic health review and, for this reason; SACN has primarily relied on the evidence identified for the *Carbohydrates and Health* report. The analyses by Sheiham and James have not been included in the report as they are based on ecological data, which do not meet SACN's inclusion criteria.
	British Association for the study of Community Dentistry	A recent prospective cohort study of the relationship between sugar sweetened beverage (SSB) intakes and dental caries in adults has recently been published (Bernabé et al., 2014).	SACN thanked the respondent for highlighting this additional study; this has been included in the report.
	Fibre Consortium	The submission by the Fibre Consortium noted the following 5 publications related to arabinoxylan oligosaccharides (AXOS) (*see appendix 1 of full response*): • François IEJA et al., Effects of a wheat bran extract containing arabinoxylan oligosaccharides on gastrointestinal health parameters in healthy adult human volunteers: a double-blind, randomised, placebo controlled, cross-over trial. BJN 2012; 108: 2229–2242.	SACN thanked the respondent for highlighting these additional studies. Cloetens et al. 2010 and Francois et al. 2012 were included in the colorectal health and update search respectively, however, these studies provided insufficient evidence to draw a conclusion according to the grading system. Francois 2014 was

	Submitter	Comments	Action agreed by SACN
		• François IEJA et al., Effects of Wheat Bran Extract Containing Arabinoxylan Oligosaccharides on Gastrointestinal Parameters in Healthy Preadolescent Children. JPGN 2014;58: 647–653. • Maki KC et al., Digestive and physiologic effects 2 of a wheat bran extract, arabinoxylan-oligosaccharide, in breakfast cereal. Nutrition 2012;28: 1115-21. • Cloetens L et al., Tolerance of arabinoxylan-oligosaccharides and their prebiotic activity in healthy subjects: a randomised, placebo-controlled cross-over study. BJN 2010;103: 703–713. Rao et al. (2001), Kolida et al. (2007), and Bouhnik et al. (2007) published randomized, controlled human dietary intervention studies that were not taken into account in the SACN report. In the first publication, significantly increased numbers of faecal Bifidobacterium spp. were reported after oligofructose supplementation with 5 grams per day. In the latter two studies, this effect was reported after inulin supplementation with 5 grams per day (*see Annex 3 of full response*). Three published studies have not been included in this review in relation to faecal bulking. Endo et al. (1991) reported a significant increase in faecal weight with 15 g/day of polydextrose, Vester-Boler et al. (2011) reported a significant increase in faecal (dry) bulk with 21 g/day of polydextrose, and Timm et al., (2013) reported a significant increase in faecal weight with 20 g/day of polydextrose.	conducted in children, therefore not included with adults and insufficient to be included on its own in the children section. The other study (Maki 2012) was published after the cut off but does meet the inclusion criteria of the colorectal health review. With the inclusion of this additional study, it has allowed a conclusion on arabinoxylan and faecal bacteria to be drawn in the final report. Rao et al. 1991, Kolida et al. 2007 and Endo et al. 1991 do not meet the inclusion criteria for the colorectal health review. Bouhnik et al. 2007 and Vester-Boler et al. 2011 are included in the colorectal health review and the update search, respectively, but these studies provided insufficient evidence to draw a conclusion according to the grading system. Timm et al. 2013 was published after the cut-off date but does meet the inclusion criteria of the colorectal health review.
	FDF	Within any further analysis of energy intake versus sugars intake (figure 1 chapter 11, section 11.12, p202), we would also welcome the inclusion of data from Reid, M., Hammersley, R. *et al*. (2014). Effects on obese women of the sugar sucrose added to the diet over 28 d: a quasi-randomised, single-blind, controlled trial. *BJN*; **111**(3): 563-570.	SACN thanked the respondent for highlighting this additional study; this has been included in the final report.

	Submitter	Comments	Action agreed by SACN
	Professors James & Sheiham	<u>Dental caries</u> • Bernabé E; Sheiham A. 2014a. Age, Period and Cohort Trends in Caries of Permanent Teeth in Four Developed Countries. Amer J Pub Health 2014;104(7):115-121. Shows the increase in caries with increasing age based on national surveys in four countries. • Bernabé E, Sheiham A. 2014b. Extent of Differences in Dental Caries in Permanent Teeth Between Childhood and Adulthood in 26 Countries. International Dental Journal 2014 26th May doi: 10.1111/idj.12113. Shows the percentage and actual increases in caries between the ages of 12 and 35-44 years. • Sheiham A, James WPT. 2014a. A reappraisal of the quantitative relationship between sugar intake and dental caries; the need for new criteria for developing goals for sugar intake. BMC Public Heath 2014,14:863 http://www.biomedcentral.com/1471-2458/14/863 (Accepted. To be published on 16th September). This outlines the basis for the dose response relationship between caries in children and sugars being linear. • Sheiham A, James WPT. 2014b. A new understanding of the relationship between sugar, dental caries and fluoride use: implications for limits on sugars consumption. Public Health Nutrition 2014 Jun 3:1-9. <u>Sugar and blood pressure/lipids</u> • Te Morenga LA, Howatson AJ, Jones RM, Mann J. Dietary sugars and cardiometabolic risk: systematic review and meta-analyses of randomized controlled trials of the effects on blood pressure and lipids. Am J Clin Nutr. 2014 May 7;100(1):65-79	SACN thanked the respondent for highlighting these additional studies. Bernabé et al 2014a and b describe the prevalence of dental caries in adults and has been included in the report for background information. The analyses by Sheiham and James have not been included in the report as they are based on ecological data, which do not meet SACN's inclusion criteria. Te Morenga et al. 2014 has been acknowledged in the final report. The author's inclusion criteria are very different from the cardiometabolic health review and, for this reason, SACN has primarily relied on the evidence identified for the *Carbohydrates and Health* report.

	Submitter	Comments	Action agreed by SACN
	JRS	Summary: Three randomized controlled trials presented evidence that insoluble oat fibre (Weickert MO et al. 2005, Weickert MO et al. 2006, Weickert MO et al. 2011) and one study, that insoluble wheat fibre (Weickert MO et al. 2005) improve insulin sensitivity. • Weickert et al. 2005. Impact of cereal fibre on glucose-regulating factors. Diabetologia. 2005 Nov;48(11):2343-53. Epub 2005 Sep 20. • Weickert et al. 2006. Cereal fibre improves whole-body insulin sensitivity in overweight and obese women. Diabetes Care. 2006 Apr;29(4):775-80. • Weickert et al. 2011. Effects of supplemented isoenergetic diets differing in cereal fibre and protein content on insulin sensitivity in overweight humans. Am J Clin Nutr. 2011 Aug;94(2):459-71	SACN thanked the respondent for highlighting these additional studies**.** Weickert et al. 2005 and 2006 do not meet the inclusion criteria of the cardiometabolic health review in terms of study duration**.** Two of the intervention groups in Weickert et al. 2011 exceed the blood pressure cut off of 140/90. Therefore none of the studies listed have been included in the final report.
	Nestle	In the context of consumer behaviour we also think the SACN review could be strengthened by greater consideration of the effectiveness of low-calorie sweeteners, and other carbohydrate-replacers, for weight management. There are limited data suggesting that *"low calorie sweeteners used as one aspect of a multi-faceted program may be beneficial in preventing and reversing overweight and obesity,"* Foreyt et al (2012). • Foreyt,J, Kleinman,R, Brown,RJ, Lindstrom,R: The use of low-calorie sweeteners by children: implications for weight management. J Nutr 142:1155S-1162S, 2012 • Sørensen LB, Vasilaras TH, Astrup A, Raben A. Sucrose compared with artificial sweeteners: a clinical intervention study of effects on energy intake, appetite, and energy expenditure after 10 weeks of supplementation in overweight subjects. Am J Clin Nutr. 2014 Apr 30;100(1):36-45. [Epub ahead of print]	SACN thanked the respondent for highlighting these additional studies. Foreyt et al. 2012 is a narrative review and therefore, has not been used as a primary source of evidence in the report. Sørensen et al. 2014 is a sub study of Raben et al. 2002. It measures energy expenditure using a respiratory chamber instead of using self-reports of energy intake. This study has been acknowledged in the report but the findings in Raben et al. 2002 provide the main source of evidence for this study in the final report.

	Submitter	Comments	Action agreed by SACN
		We would also like to recommend some additional papers that could be useful for the Carbohydrate Report – • Willis HJ, Thomas W, Eldridge AL, Harkness L, Green H, Slavin JL. Glucose and insulin do not decrease in a dose-dependent manner after increasing doses of mixed fibres that are consumed in muffins for breakfast. Nutr Res. 2011 Jan;31(1):42-7. • Willis HJ, Thomas W, Eldridge AL, Harkness L, Green H, Slavin JL. Increasing doses of fibre do not influence short-term satiety or food intake and are inconsistently linked to gut hormone levels. Food Nutr Res. 2010 Jun 29;54.	Willis et al. 2010 and 2011 do not meet the inclusion criteria of the cardiometabolic health review in terms of study duration and, therefore, have not been included in the final report.
	PHE – Dental Public Health	Although it is appreciated that this study falls outside the search time-frame, an eligible prospective cohort study of the relationship between sugar sweetened beverage (SSB) intakes and dental caries in adults has recently been published (Bernabé et al., 2014).	SACN thanked the respondent for highlighting this additional study; this has been included in the final report.
	Sugar Nutrition UK	Additional study identified for inclusion within the energy intake section: Reid, M., *et al.* (2014). Effects on obese women of the sugar sucrose added to the diet over 28 d: a quasi-randomised, single-blind, controlled trial. *Brit J Nutr;* 111(3): 563-570. Supports the findings of previous studies by Reid et al. (2007 and 2010) that the inclusion of large volumes of sugars-sweetened beverages to the diet can be compensated for by voluntary reduction of other energy sources in the diet. One study published since the meta-analysis was completed has also been identified. No statistically significant association of SSB consumption was reported with incidence of type 2 diabetes (Sakurai *et al.,* 2013) within this cohort of middle aged Japanese men. A significant and positive association was observed with diet soda intake.	SACN thanked the respondent for highlighting these additional studies; both of which have been included in the final report.
		Additional studies identified for inclusion within the energy intake section. We wish to draw your attention to three studies that should have been	SACN thanked the respondent for highlighting these additional studies. Lawton et al.1998 does not appear to

	Submitter	Comments	Action agreed by SACN
		included in the analysis according to the stated criteria: • Lawton, C. L., H. J. Delargy, *et al*. (1998). A medium-term intervention study on the impact of high- and low-fat snacks varying in sweetness and fat content: large shifts in daily fat intake but good compensation for daily energy intake. *Brit J Nutr;* 80(2): 149-161. • Reid, M., *et al.* (2010). Effects of sucrose drinks on macronutrient intake, body weight, and mood state in overweight women over 4 weeks*. Appetite;* 55(1): 130-136. • Aeberli, I., *et al*. (2011). Low to moderate sugar-sweetened beverage consumption impairs glucose and lipid metabolism and promotes inflammation in healthy young men: a randomized controlled trial. *Am J Clin Nutr*; 94(2): 479-485. The studies by Reid *et al.* (2010 and 2014) support the findings of the 2007 paper, published by the same group that the inclusion of large volumes of sugars-sweetened beverages to the diet can be compensated for by voluntary reduction of other energy sources in the diet. Also, of relevance to this area is a new study presented at this summer's Nutrition Society Meeting: • Markey and Lovegrove (2014) OC122: Dietary energy compensation in response to reduced sugar diet in non-obese men and women. University of Reading. This crossover study provided 45 subjects with original or reformulated lower sugar products over two 8 week periods, with large differences in NMES intake during the study: 19.7% versus 8.3% respectively. Notably, there was no difference in energy intake or bodyweight following the two arms.	provide information on sugars intake and therefore, has not been included in the final report. Reid et al. 2010 and 2014 and Aeberli et al. 2011 have been included in the final report. Markey and Lovegrove have not been included as SACN does not use abstracts as a primary source of evidence.
Further research	Action on Sugar	We would like the authors to note that any calls for double blind trials for free sugars, or other outcome or systematic reviews is just a delaying tactic particularly favoured by organisations that are backed (or surreptitiously backed) by the food industry: the evidence is already overwhelming. It is impossible to keep people on different diets for long periods of time, plus the numbers of people needed to show a significant	SACN thanked the respondent for their comments.

	Submitter	Comments	Action agreed by SACN
		difference in outcome are so great and costly, that these studies will never be done. Calling for such studies is akin to “moving the goalposts”; as reducing the intake of free sugars will be stridently opposed by commercial vested interests, we will be continually vigilant for such attempts to undermine public health. Free sugars play a very important role in causing obesity and dental caries and we should not be waiting for outcome trials. At this crucial point in time we don’t need further research, we need action – the obesity crisis is highly pressing that any further delays would have a huge deleterious impact on health in the UK.	
	British Association for the study of Community Dentistry	Recommendations in final report should include further research to address identified evidence gaps in the systematic review e.g. relating to caries in adults and infant feeding.	SACN thanked the respondent for suggesting areas of further research. A future research section detailing the current gaps in the evidence base has been included in the final report.
	British Dental Association	We call for further research, with the required funding, to fill the evidence gaps in relation to sugar and oral health highlighted in the draft SACN review.	SACN thanked the respondent for suggesting areas of further research. A future research section detailing the current gaps in the evidence base has been included in the final report.
	Cardiff and Vale UHB	There is further research to establish whether there is an association between total or individual sugar intake and type 2 diabetes.	SACN thanked the respondent for suggesting areas of further research. A future research section detailing the current gaps in the evidence base has been included in the final report.

	Submitter	Comments	Action agreed by SACN
	Dr Madden and Dr Vafeiadou	❑ In view of SACN's recommendation to consume dietary fibre from sources including pulses, an investigation of both the gastrointestinal effects (or perceived effects) of pulses which might deter consumers from eating them and the potential cooking or processing that might ameliorate these and help promote consumption of pulses.	SACN thanked the respondent for suggesting areas of further research. A future research section detailing the current gaps in the evidence base has been included in the final report.
	Nestle	We consider that additional intervention studies are needed to evaluate the impact of reducing the population average free sugars intake to around 5% of dietary energy intake on body weight management and metabolic health. We would like to see the evidence base to demonstrate that a Dietary Reference Value (DRV) for free sugars of around 5% of energy as a population average will lead to individual intakes of less than 10% of energy strengthened. We believe that further science and research is needed to address the challenge of decreasing free sugar consumption without increasing the consumption of other public health sensitive nutrients, such as fat or salt, which like sugar provide a pleasurable dimension to the experience of eating. Public health will only be improved if consumers act on the recommended values by reducing their intake of free sugars and increasing their intake of dietary fibre. Therefore, we consider that the section on "further research" (page 218) should include studies that are not only related specifically to carbohydrates identify hurdles and solutions for changing consumer behavior (e.g. psychology-, sociology-, and economics-related studies) and that these should be considered as part of the implementation of any final recommendations of the SACN review.	SACN thanked the respondent for suggesting areas of further research. A future research section detailing the current gaps in the evidence base has been included in the final report.
	Nutrition Society	The report is based on self-reported intakes of carbohydrates and does indeed highlight the inaccurate method of self-reported measures of intake and misreporting. So conclusions are being drawn regarding intakes which may or may not be accurate. Of course this is the only available method open to us to measure carbohydrate intake but based on this fact shouldn't there be a push from research councils or the food	SACN thanked the respondent for suggesting areas of further research. A future research section detailing the current gaps in the evidence base has been included in the final report.

	Submitter	Comments	Action agreed by SACN
		standards agency (DoE) to develop biomarkers of carbohydrate intake that are indeed more accurate than self-reported intake measures and that can be used at a population level? Only when we know more accurately our intake of individual and total carbohydrate can we know at what level is beneficial and what is harmful.	
	Nutrition Society	Future research should focus around improving the credibility of nutritional advice in relation to long-term health outcomes. Understanding mechanism There should be a focus of effort toward understanding mechanism where cohort studies suggest benefit. Without mechanism association is meaningless. https://medweb.nch.org/INTERMED/Data/ComponentFiles/1099/14_ABOG_May%202013.pdf This work could include studies using animal models but using human relevant concentrations of dietary factors such as fibre. Many animal studies have already been conducted but using for example too high concentrations of fibre or too little fat and at an inappropriate age range etc. However, there should be increased effort to use currently available data such as gene expression patterns from animal studies to design human studies with relevant and practical markers of risk. Better markers of risk amenable to dietary modification As is pointed out in the report, many markers of risk are valid at the population level but less predictive for each individual. Biomarker based advice is more likely to be successful in getting people to change their diet if there is a more personalised and certain link between risk marker and disease outcome. The issue of identifying better markers of long-term disease risk is not specific to nutrition studies. The use of post genomic technologies is still in its infancy in nutrition. Across the world we have large numbers of bio-banks, mostly set up in	SACN thanked the respondent for suggesting areas of further research. A future research section detailing the current gaps in the evidence base has been included in the final report.

	Submitter	Comments	Action agreed by SACN
		the last decade or two. In the future these may provide better prospective data in relation to biomarkers in apparently healthy people and disease outcome. Assuming such biomarkers can be identified then research into nutritional interventions able to target beneficial changes in such biomarkers will carry considerably more credence and should allow better preventative approaches. Understanding mechanism can inform the identification of risk markers. The area of inflammatory markers is a good example but there are still issues around the validity of for example blood samples to identify inflammation at local sites or even to distinguish between chronic and acute inflammatory response. Research into improving these risk markers should continue and will help to provide more convincing end-points for RCTs. <u>Implementing advice</u> As a member of a Health Research Authority ethics committee I see an increase in research effort as how to support people to lose weight and to understand socioeconomic factors limiting the uptake of advice. Much of this work is undertaken on a small scale and there should perhaps be a more concerted effort to bring together psychologists and nutritionists and medical professionals. (The need for education of doctors and nurses in this area has been highlighted to me anecdotally by the naivety of the content of their proposals, such as actually encouraging the use of low carbohydrate diets). The ethics of giving advice is an interesting research topic, again far wider than just related to carbohydrates or even nutrition. Should the government give advice when it is based on so much uncertain data? Should this level of uncertainty be conveyed to the general public or would this undermine the message? There may be research published in this area that we as nutritional scientists should be made aware of?	

	Submitter	Comments	Action agreed by SACN
	Sugar Nutrition UK	Evidence needs to be provided to show that no unintended consequences of a single nutrient focused reduction will occur. It is unclear what impact the proposed population sugars reduction would have on nutrient intake. Studies have shown that there is a sugar-fat see-saw, raising the concern that any reduction in sugar may be replaced by fat (Sadler *et al*, 2013). This may lead to unintended consequences and thus requires further study.	SACN thanked the respondent for suggesting areas of further research. A future research section detailing the current gaps in the evidence base has been included in the final report.

Table 10: Risk management

	Submitter	Comments	Response to comments.
General comments	Action on Sugar	Although policy recommendations are out of scope of this response, it must be recognised in the report that the revised recommendations must be accompanied by a robust policy response from Government to ensure that the reductions in intake - and the accompanying health gains - are achieved. We draw your attention to our seven-point Childhood Obesity Action Plan prepared for Jeremy Hunt – Secretary of State for Health8. The plan is an effective strategy to prevent obesity in children, by changing the food environment (modelled on the successful salt reduction programme in the UK), which outlines 7 key actions required to prevent obesity in children: 1. Reduce added sugars by 40% by 2020 by reformulating (similar programme to salt) 2. Cease all forms of marketing of ultra-processed, unhealthy foods and drinks to children 3. Disassociate physical activity with obesity via banning junk food sports sponsorships 4. Reduce fat in ultra-processed foods, particularly saturated fat – 15% reduction by 2020 5. Limit the availability of ultra-processed foods and sweetened soft drinks as well as reducing portion size 6. Incentivise healthier food and discourage drinking of soft drinks by planning to introduce a sugar tax 7. Remove responsibility for nutrition from the Department of Health and return it back to an independent agency.	PHE is currently considering the evidence in relation to a number of potential actions that could be taken to reduce sugar intakes, in line with the 'Sugar Reduction: Responding to the Challenge' document published in June 2014[15]. This includes a review of the evidence on fiscal measures, and marketing and promotions, targeted at reducing sugar intakes and the resultant impact on attitudes, consumption and health. It will look at incentives already implemented internationally and any evaluation of their efficacy. This programme of work also includes supporting the Department of Health in working with the food and drink industry through the Government's Public Health Responsibility Deal. This package of evidence will be used alongside SACN's finalised recommendations, to provide advice to the Department of Health to inform government's thinking on sugar in the diet.

[15] Public Health England. Sugar Reduction. Responding to the Challenge. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/324043/Sugar_Reduction_Responding_to_the_Challenge_26_June.pdf (accessed 27 January 2015)

	Submitter	Comments	Response to comments.
	ASO	ASO notes that the proposed population intakes for children over age 2 has implications on existing advice for the appropriateness or otherwise of population 'healthy eating' recommendations for children under age 5. ASO also notes that the inclusion of fruit juice in the definition of free sugars will have implications for the existing 5 a day message. Clarity on these issues will be required.	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers.
	British Dietetic Association	Public understanding may be confused as labelling information relates to "Total Sugars". Example: A natural yoghurt contains no "Free Sugars", but 7g/100g "Total Sugars". A fruit yoghurt contains 6g "Free Sugars" and 13g/100g "Total Sugars". While the term "Free Sugars" is helpful for those familiar with carbohydrate structures, the word "Free" to the general public could be interpreted as energy that 'doesn't count' i.e. free from kcal. Data on "Free Sugars" should be available in UK food tables, such as inclusion in the 7th edition (and on-going) of the McCance & Widdowson's The Composition of Food (current edition only has "Total Sugars" and individual sugars). If not, SACN should produce draft guidance about what to use for evaluation and implementation and work with the Royal Society for Chemistry for future editions of The Composition of Food.	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers. We have no plans, at present, to change the way in which McCance and Widdowson reports the amount of sugar and fibre in foods. In the 7th edition of McCance and Widdowson, fibre is presented as non-starch polysaccharide and as AOAC fibre. Future food composition analyses will be planned to extend the AOAC fibre data available. McCance and Widdowson will continue to report the amount of total sugars and individual sugars in foods rather than the free sugars content of foods, as free sugar content must be estimated rather than derived from analysis and so is open to

	Submitter	Comments	Response to comments.
		With the new term “Free Sugars” should come a concerted effort to proactively and effectively promote these changes and their meanings to the general public. This new term comes at a time when many are already confused with a lack of consistent messaging around carbohydrates, such as wholegrain versus refined carbohydrates e.g. bread versus sugars. The concept of “Free Sugars” is helpful in explaining why fruit is important in the diet, with the need for extracted fruit juice to be limited. We recognise the recommendations are population based and the purpose is to improve the health of the population. However, it is important to state that there are specific groups within the population where there nutritional needs require variation from these population norms. This will include the frail elderly or those with specific health needs.	differences in interpretation. In order to promote a consistent approach we will engage interested parties in developing and disseminating the definition and calculation of ‘free sugars’. PHE is considering the implications of the recommendations in SACN’s draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers
	British Nutrition Foundation	Labelling restrictions make it less easy to flag fibre content than is the case for some other food components (as a reference intake for fibre has not been incorporated within the FIC regulation and fibre is not included in the list of nutrients that can be declared front-of-pack). To guide consumer choice, ways round these limitations will need to be identified.	Current labelling requirements already provide a way forward unconnected to FIC. However, PHE is considering the implications of the recommendations in SACN’s draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers.

	Submitter	Comments	Response to comments.
	BRC	Clarification is also required on the advice to be used by a company or a health professional when giving nutrition advice to an individual; should this advice be based on the population or the individual maximum consumption of free sugars? Retailers would like to understand how SACN/PHE suggests communicating the recommended maximum intake of free sugars to customers, in the absence of any available information to them on the quantity of free sugars in food products. The report suggests ruling out the terms soluble and insoluble fibre, as there is a lack of consistent physiological effects, despite the fact that the studies refer to in the report use this classification. Consumers are familiar with this terminology and therefore thought must be given to how to explain this change to consumers. Without an agreed reference intake for fibre in legislation nor any imperative in the legislation to label fibre content, we are concerned that the recommended DRV for fibre will not be easily communicated. Added to the lack of any agreed claims, SACN's ambition to increase fibre intakes will be severely compromised.	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers
	Cardiff and Vale UHB	The UK government should help to curb consumption of processed foods through: Taxation and health warnings on sugary drinks; A ban on advertising of junk food advertising before 9pm; Working with the food and drinks industry to ensure that products have healthier formulations and incentivise healthier products; Reaching agreement on a universal food traffic light system; The use of mandatory, visible calorie counts in fast food outlets and restaurants. This report should consider the impact of dietary sugars which are "hidden" in processed foods, not traditionally associated as sweet e.g. white bread.	PHE is currently considering the evidence in relation to a number of potential actions that could be taken to reduce sugar intakes, in line with the 'Sugar Reduction: Responding to the Challenge' document published in June 2014. This includes a review of the evidence on fiscal measures, and marketing and promotions, targeted at reducing sugar intakes and the resultant impact on attitudes, consumption and health. It will look at incentives already implemented internationally and any evaluation of their efficacy. This programme of work also includes

	Submitter	Comments	Response to comments.
			supporting the Department of Health in working with the food and drink industry through the Government's Public Health Responsibility Deal. This package of evidence will be used alongside SACN's finalised recommendations, to provide advice to the Department of Health to inform government's thinking on sugar in the diet.
	Dairy UK	At policy level, it will be important to take these differences into account when proposing food recommendations, educating consumers and applying any other measures (e.g. fiscal or restrictions on advertising). Specifically with regards to educating consumers, it is important that they are provided with clear and straightforward information on the distinction different types of sugar and the difference between products with added sugars which are nutritionally poor and rich.	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers.
	Dietitians in Obesity Management UK	Nationally, more stringent regulations on advertising and marketing particularly to children and young people, as well as taxes, need to be examined as options, regardless of political persuasion. It is clear that current approaches are not sufficient. Given that higher intake of sugar and lower intake of fibre are associated with deprivation (SACN, 2014); this is not just a public health issue, but one of social inequalities which may worsen in the absence of decisive and successful action.	PHE is currently considering the evidence in relation to a number of potential actions that could be taken to reduce sugar intakes, in line with the 'Sugar Reduction: Responding to the Challenge' document published in June 2014. This includes a review of the evidence on fiscal measures, and marketing and promotions, targeted at reducing sugar intakes and the resultant impact on attitudes, consumption and health. This package of evidence will be used

	Submitter	Comments	Response to comments.
			alongside SACN's finalised recommendations, to provide advice to the Department of Health to inform government's thinking on sugar in the diet.
	Director of Public Health for Knowsley Metropolitan Borough Council	I believe that a comprehensive package of policy measures is necessary to challenge the current high consumption of sugar. Research by Heart of Mersey has shown that a 20p per litre duty on sugar-sweetened beverages would lead to a reduction in the number of cases of obesity across the North West of England by over 19,5003. The research also indicates that this measure would lead to a concomitant reduction in the number of cases of type 2 diabetes, stroke, coronary heart disease and cancer. Whilst approaches to reduce sugar that utilise public information campaigns, voluntary guidelines and warning labels on products are of value, it is considered that only approaches that have a direct impact upon availability and supply, such as a duty on sugary drinks that will have a truly transformative impact upon public health outcomes. It is also our recommendation, in line with those suggested by Public Health England, that fiscal measures to combat sugar intake should take the form of a hypothecated tax which would provide revenue to a health fund. Furthermore, Food Active would favour legislation that places restrictions upon the advertisement of high sugar food and drink to children and adults (e.g. close down loopholes that allow adverts for unhealthy food and drinks on TV before 9pm). Food Active would also favour restrictions on junk food and drink sponsorship of sport and leisure activities, for example, the Coca Cola ParkLives initiative.	PHE is currently considering the evidence in relation to a number of potential actions that could be taken to reduce sugar intakes, in line with the 'Sugar Reduction: Responding to the Challenge' document published in June 2014. This includes a review of the evidence on fiscal measures, and marketing and promotions, targeted at reducing sugar intakes and the resultant impact on attitudes, consumption and health. It will look at incentives already implemented internationally and any evaluation of their efficacy. This package of evidence will be used alongside SACN's finalised recommendations, to provide advice to the Department of Health to inform government's thinking on sugar in the diet.
	FDF	If SACN considers maintaining two recommended values is appropriate, we would welcome advice on how the figures should be used when communicating with the general public. We appreciate this may be viewed as policy implementation and therefore out with SACN's remit,	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will

	Submitter	Comments	Response to comments.
		however as these figures will strongly inform policy we feel clarity from SACN as to their considerations of the most appropriate uses is valuable.	decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers.
	FSAI	FSAI agree with the conclusions that free sugars must be limited and that the previous upper limit of 30% needs to be revised considerably (Paragraph 11.5). However the recommended mean intake of 5% is set too low for palatability of low fat, low saturated fat diets. For similar reasons the maximum level of free sugars intakes needs to be increased to ~12%. Notwithstanding that reservation FSAI agree that free sugars need to be limited but for this, the role of different food sources of sugar needs to be considered i.e. food sources that are 'fat-free' vs. 'fat-containing' and become 'part of a low-fat nutrient dense food' vs. 'those that are strictly additional' In an earlier study of dietary intakes in Ireland the inverse relationship between total fat and non-milk extrinsic sugars (NMES) sugars intake was found to extend to saturated fat (see Flynn et al 1996). Examination of the food sources of NMES sugars in this study categorised these foods into those that were 'fat-free high sugar foods' and 'fat-containing high sugar foods'. The 'fat-free high sugar foods' were found to be associated with lower fat and saturated fat intakes while the 'fat-containing high sugar foods' were not. Furthermore the low fat and low saturated fat diets that contained higher quantities of the 'fat-free high sugar foods' were associated with higher intakes of fibre and micronutrients with the exception of vitamin A (Flynn et al 1996). This demonstrates that 'fat-free high sugar foods' have a role - albeit in limited amounts, as part of a healthy diet. The role of 'fat-free high sugar foods' play in palatability of low fat, high fibre diets arises when formulating dietary guidelines. For this task 'fat-free high sugar foods' need further classification into those that become part of a low-fat high fibre or micronutrient-rich food (e.g. sparing use of sugar in porridge or preserves on wholemeal bread) vs. those that are simply additional (e.g. sugar-sweetened beverages or sugar added to tea). This is outlined in a report	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers.

	Submitter	Comments	Response to comments.
		of FSAI work revising the food-based dietary guidelines for Ireland (Flynn et al 2011b). An iterative approach to develop twenty-two 4 day food intake patterns until average intakes met a range of nutrient and energy goals that represented the variable nutritional requirements of all in the population aged 5 years and older. Achieving low saturated fat intakes (<10% energy) was difficult as was achieving the dietary fibre goal of 25g per day for those with energy needs below 9.2MJ/day. These healthy eating goals, including keeping intakes of non-milk extrinsic sugars (NMES) below 10% energy, were largely achieved – but the mean NMES intakes ranged between 6.2 – 11.5% energy. Notwithstanding the fact that Free Sugars will amount to slightly lower levels compared with NMES, the mean goal of 5% energy intake would not be achieved. In the published report (Flynn et al 2011b) we outlined the advice on sugars as follows: 'This revision found that fibre goals were difficult to achieve, as previously reported in Ireland, particularly in food patterns that were based on lower energy requirements (<10MJ/ <2,400 kcals). Specific adjustments of food patterns involved the sparing use of two fat-free sources of sugar - namely, table sugar and preserves, to increase the acceptability and palatability of fibre-rich food sources, such as wholemeal cereals, breads and stewed fruit – an approach that has been previously used. *This approach is in agreement with the SACN Draft Carbohydrates and Health Report regarding the recommendation that 'consumption of sugar-sweetened beverages should be minimised in both children and adults' and frequent intake of sugars should be avoided for better dental health. The relevant section of this report (Flynn et al 2011b) is outlined below:* However this revision of healthy eating advice also includes advice to avoid frequent intakes of sugar for the promotion of good dental health. Previous work in Ireland has highlighted an inverse relationship between saturated fat and sugar and preserves and the inverse relationship between sugar and fat intakes is well established. Notwithstanding this, the inclusion of sugar and sugary foods for their own sake (i.e. independent of fibre-rich foods) was not supported in this	

	Submitter	Comments	Response to comments.
		revision. Consumption of sugary foods, such as soft drinks, or sugary foods that also contain fat, such as confectionery, increase intakes of energy and possibly fat, without providing essential nutrients, and high-fat sweet foods may be positively associated with obesity.	
	Dr Gordon	The received response was originally drafted as comment for the US Food and Drug Administration 'regarding revision of food labelling regulations and specifically the Nutrition Facts panel.' The respondent assumed that SACN's consultation 'has some relation to consumer education in the UK, and possibly to your food labelling standards'. The submission is focused on fibre and argues that fibre should be considered an essential nutrient. See full response for further details. The respondent notes that whole grain is frequently considered a source of dietary fibre, while in fact providing relatively little dietary fibre: "The real value of enhanced whole grain, whole grain foods, and consumption is to help reduce the calorie content of the diet. The purpose of these comments is not to disparage whole grains, but just to state that they are not a significant source of dietary fibre in the food supply. A solution to this is to have whole grain foods fortified- enriched with added fibre. While not changing the definition of whole grains, allow for specific levels of dietary fibre to be added. The source and type of DF is left to the food manufacturer to have a food product that is acceptable to the consumer."	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers
	Dr Madden and Dr Vafeiadou	In order to evaluate intakes, data on free sugars need to be available in UK food tables and we hope this is included in the 7th edition of the McCance & Widdowson's The Composition of Food which is due for publication very soon (6th edition only has total sugars and individual sugars). If not, then we suggest SACN gives guidance about what to use for evaluation and implementation and we urge discussion between	We have no plans, at present, to change the way in which McCance and Widdowson reports the amount of sugar and fibre in foods. In the 7th edition of McCance and Widdowson, fibre is presented as non-starch polysaccharide and as AOAC fibre. Future food

	Submitter	Comments	Response to comments.
		SACN and the Royal Society of Chemistry for future editions. We suggest the following ideas for future research recommendations: • Evaluation of the effect of fiscal measures on free sugar consumption using both consumer and health economic approaches, e.g. using model used in Netherlands (Waterlander 2014 Appetite) • □ Exploration of the need for a practical and easily understood scheme for consumers to use to assess their free sugar intake, e.g. comparable with five-a-day for fruit and vegetables, and if needed, subsequent implementation and evaluation.	composition analyses will be planned to extend the AOAC fibre data available. McCance and Widdowson will continue to report the amount of total sugars and individual sugars in foods rather than the free sugars content of foods, as free sugar content must be estimated rather than derived from analysis and so is open to differences in interpretation. In order to promote a consistent approach we will engage interested parties in developing and disseminating the definition and calculation of 'free sugars'. PHE is currently considering the evidence in relation to a number of potential actions that could be taken to reduce sugar intakes, in line with the 'Sugar Reduction: Responding to the Challenge' document published in June 2014. This includes a review of the evidence on fiscal measures, and marketing and promotions, targeted at reducing sugar intakes and the resultant impact on attitudes, consumption and health. It will look at incentives already implemented internationally and any evaluation of their efficacy. This package of evidence will be used alongside SACN's finalised recommendations, to provide advice to the Department of Health to inform

	Submitter	Comments	Response to comments.
			government's thinking on sugar in the diet.
	MRC Human Nutrition Research	The NDNS is an important source of data to inform reports such as this. Also, the NDNS can be utilised to inform public health policy and to evaluate the outcomes of any changes in dietary recommendations and healthy eating advice. Changing the definition of fibre from NSP to fibre defined by AOAC method 2009.01 and changing from NMES to free sugars will have implications for reporting in the NDNS, specifically making comparisons between NDNS data over time. This may need further consideration by organisations involved in the survey. The main points that may need consideration: ❑ To make comparisons with data in past survey years, especially within the current rolling programme, users will need to be able to compare 'like-for-like'. This means that either: in the future the NDNS reporting will need to provide data for both the old and the new definitions of sugars and fibre; or in the future the report only provides data for the new definitions, but the past NDNS surveys are re-calculated to provide intakes according to the new definitions. The latter option may be the most useful to reduce confusion in future reports by only providing the new definition, but also providing re-calculations of past NDNS using the new definition will allow comparisons to be made with past surveys. Thus, we think it is important to alert SACN to the need to be cautious in reviewing evidence in the future. ❑ To enable these changes it will be important to consider that food composition tables will need to be comprehensive and fit for purpose for monitoring population intake of free sugars and fibre defined by the AOAC method 2009.01. The NDNS RP utilises the PHE nutrient databank, therefore relevant updates of the data to include a comprehensive dataset of free sugars and AOAC fibre values within all foods would need to be considered. A programme of updates to the	It is planned that the intake of sugars will be reported as free sugars and fibre intake as AOAC fibre in future publications of the National Diet and Nutrition Survey (NDNS). We will consider reporting in the NDNS with current and any future survey partners, including ways to ensure that trends can be reported in meaningful and informative ways. The food composition databank used with the NDNS is reviewed regularly with our survey partners, and ensuring that it can deal with the recommendations from SACN will be a high priority. PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will

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		nutrient databank for use in the NDNS survey work may be required. Additionally, if SACN wish to make the recommendations accessible to a wide audience, SACN may wish to consider producing a summary similar to the 'Why 6g? A summary of the scientific evidence for the salt intake target', which was produced by MRC HNR to summarise the scientific recommendations in the SACN 2003 'Salt and Health' report.	decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers
	Nestle	It should be evaluated what would be the most effective way to cut sugars in children/adolescents, as they are the group with the highest sugar consumption, but for whom cutting down sugar-sweetened beverages seems to be ineffective. Foreyt et al (2012).	PHE is currently considering the evidence in relation to a number of potential actions that could be taken to reduce sugar intakes, in line with the 'Sugar Reduction: Responding to the Challenge' document published in June 2014. This includes a review of the evidence on fiscal measures, and marketing and promotions, targeted at reducing sugar intakes and the resultant impact on attitudes, consumption and health. It will look at incentives already implemented internationally and any evaluation of their efficacy. This package of evidence will be used alongside SACN's finalised recommendations, to provide advice to the Department of Health to inform government's thinking on sugar in the diet.
	NICE	Although these terms [free sugars and AOAC fibre] are helpful, it will be important to ensure careful communication of these changes, the implications for labelling and on-going population monitoring. NICE notes that the proposed population intakes for children over age 2	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will

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		has implications on existing advice for the appropriateness or otherwise of population 'healthy eating' recommendations for children under age 5. NICE also notes that the inclusion of fruit juice in the definition of free sugars will have implications for the existing 5 a day message. Clarity on these issues will be required. In relation to the implementation of SACN's recommendations, we would encourage consideration of existing and forthcoming NICE public health guidance, particularly: PH11 Maternal and child nutrition PH25 Prevention of cardiovascular disease (full update due, date to be confirmed) PH35 Preventing type 2 diabetes – population and community level interventions PH49 Behaviour change – individual approaches Forthcoming guidance on Maintaining a healthy weight and preventing excess weight gain among children and adults.	decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers
	Nutrition Society	The press release reflected the conclusions of the report and was generally clearly written. It was however disappointing that the emphasis on improved intake of fibre was rather side lined in favour of the recommendation to reduce intake of sweetened drinks and fruit juices, rather than being given equal prominence. It would be interesting to understand why this occurred. In general people are more responsive to a positive message.	The press release gave equal prominence to SACN's draft recommendations about fibre and sugar.
	Nutrition Society	[35.4] It was of great relief to me that this report has been commissioned. As a newly qualified Dietitian I have repeatedly come up against conflicting information surrounding the quantities of carbohydrate an individual should consume. From my research it appears the answer to that question links with the individual's physiology and to some extent is unanswerable without careful monitoring of biological markers. I appreciate that Government recommendations have to be generalised to the general population and feel that it is my job as a Dietitian to ensure	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers

	Submitter	Comments	Response to comments.
		the outliers are given specific advice whether that be following a low fat or low carbohydrate diet. The overall overcome of this report suggests to me that weight loss is highly correlated with health improvements and that a one size fits all approach has not and continues not to solve the obesity and metabolic diseases so prevalent today. The report is by far from conclusive with its findings but I strongly believe that from this document the 'eat well plate' is outdated and no longer relevant for the general population. As most segments contain carbohydrate either in the form of starch, refined sugars, fructose or lactose. I worry that if this issue is not addressed by health professionals, the media and the internet destroy the reputation and faith that the general public have in the nutrition and dietetics associations.	
	Nutrition Society	For fibre intake the targets are based on harder endpoints, namely lower colorectal cancer risk and cardiovascular disease. A diet pattern high in pulses, whole grains, vegetables and fruit is advised. Given the lack of dietary change in relation to fruit and vegetables consumption over the last 20 years alongside an intense campaign public health campaign around 5-a day, the target of a 33% increase in fibre intake in men (and more in women) seems extremely ambitious. From a public health standpoint how does achieving this target square with diets of 5-a-day?	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers
	Nutrition Society	The issue of unintended consequences should also be explored. Dr Mary Flynn made a good point at the Nut Soc meeting about sugar-containing foods being used in practice to make 'healthier' options more palatable, e.g. high fibre cereals, low fat yogurt, fruit products, wholegrain bread. SACN need to investigate whether a stricter population target of 5% energy would have an unintended impact on intakes of healthier options, fibre consumption or, indeed, fat intakes (e.g. due to the substitution of crisps for sweets). One way around this would be to recommend a food-based, rather than a nutrient-based, approach whereby the population are encouraged to eat less of certain foods (sugar-sweetened soft drinks,	

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		biscuits, cakes, confectionery, high sugar cereals, crisps) and to eat more of other foods. Again, this was suggested by Prof Susan Jebb at the Nut Soc meeting. Assuming that SACN are determined to go down the nutrient-based route, a final issue is what message we give to the public. Do we ask them to lower sugar intakes to 5% EI, e.g. maximum 25 teaspoons daily? Or 10% EI? Given that energy requirements vary considerably, would the % energy message be confusing, or inappropriate? At the end of the day, public health recommendations have to be communicated in some way to groups of people, and to individuals. This needs to be considered now before we end up with unwieldy targets that cannot be understood, or implemented, by those who need them most. We only have to remember the problems with non-milk extrinsic sugars (NMES) which could not be analysed, nor which bore any resemblance to what consumers saw on food labels. We were stuck with NMES for more than twenty years! Let's not make the same mistake again with this opportunity to review sugar recommendations.	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers
	Nutrition Society	A comparison of NDNS data using the two definitions would be helpful as there is likely to be very little difference in the % food energy so studies using NMES (now provided in UK diet analysis programmes as well as NDNS datasets) could be used in evidence reviews along with studies using 'free sugars'. It would be useful if total sugars from the NDNS could be given in this comparison so that older studies which use total sugars can be compared with newer studies using narrower definitions, at least for the range of intake.	It is planned that the intake of sugars will be reported as free sugars in future publications of the National Diet and Nutrition Survey (NDNS). We will consider reporting in the NDNS with current and any future survey partners, including ways to ensure that trends can be reported in meaningful and informative ways.
	Professor Rugg-Gunn	I would urge that your report includes a recommendation for food labelling to list 'free sugars' concentration, rather than total sugars. The health effects of foods and drinks containing free sugars (e.g. soft drinks, confectionery) as opposed to intrinsic (fresh fruit and vegetables) and	SACN thanked the respondent for their comments. However, food labelling rules do not fall within SACN's remit.

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		milk sugars, are very different.	
	Professor Chris Seal	In developing a whole grain intake recommendation the Committee may wish to consider the approach from Denmark, which coupled with a strong public health campaign has resulted in significant increases in whole grain intake at a population level (Mejborn et al., 2013). The Danish recommendation of 75g whole grain/10MJ dietary energy was based on modelling of intake to meet dietary fibre targets assuming other targets for fruit and vegetable and other high-fibre foods were achieved. The current UK guidance to 'choose whole grain varieties whenever you can' is unlikely to be sufficient to motivate change at the population level, as evidenced by the very small change in intake in the past 10 years. Thus the Committee should establish a mechanism to develop a recommendation which has broad scientific consensus.	SACN thanked the respondent for their comments. PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers
	Sig-Nurture Ltd	The proposed 5% target represents approximately 50% reduction in intake for adults and two-thirds reduction for teenagers. This risks rejection by the public not only of these recommendations but other public health advice. One small glass of fruit juice (150ml), and one bowl of high fibre cereal would use up most of an average woman's daily sugar allowance (25g). The diet would be very restrictive: modest amounts of sugar-sweetened fruit yogurts, sugar in cooking or on fresh berries would exceed the remaining allowance while biscuits, cakes, confectionery and desserts would be a very occasional treat. Moreover, in dry foods substitution by other ingredients (per 100g) would mean the impact on calorie intake would probably be small. Substitution with other fermentable carbohydrates may not alter caries risk either. The risks of unintended consequences should be considered before finalizing this new recommendation. Salt intakes might rise as people switch to savory foods to cut sugar, while the recommendation to raise fibre intakes to 30g will be even more difficult without the use of sugar or fat to enhance palatability. In addition, a focus on sugar detracts from more substantive	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to communicate that advice to consumers

	Submitter	Comments	Response to comments.
		messages on energy balance, including energy density, portion size and the role of physical activity. Currently approximately 11.5% of the population has NMES intakes over 20% of energy. Consideration could instead be given to targeting groups with high intakes or who are at greatest risk of obesity.	
	UK Health Forum	The revised recommendations must be accompanied by a robust policy response from Government to ensure that the reductions in intake - and the accompanying health gains - are achieved. This must include positive action to ensure: a) clear food labelling (through wider use of traffic light labelling across the UK market); b) appropriate use of nutrition and health claims; c) restraint on promotions of products high in free sugars, including controls on price promotions and on marketing foods to children and young people; d) government-led standards on acceptable levels of free sugars in products that are major contributors to dietary intakes, and e) urgent exploration of fiscal measures to reduce intakes of free sugars, such as a duty on sugar-sweetened beverages (SSBs). The inclusion of fruit juices in the definition of free sugars may require some adjustment to the existing 5-a-day fruit and vegetable message.	PHE is currently considering the evidence in relation to a number of potential actions that could be taken to reduce sugar intakes, in line with the 'Sugar Reduction: Responding to the Challenge' document published in June 2014. This includes a review of the evidence on fiscal measures, and marketing and promotions, targeted at reducing sugar intakes and the resultant impact on attitudes, consumption and health. This programme of work also includes supporting the Department of Health in working with the food and drink industry through the Government's Public Health Responsibility Deal. This package of evidence will be used alongside SACN's finalised recommendations, to provide advice to the Department of Health to inform government's thinking on sugar in the diet. PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be

	Submitter	Comments	Response to comments.
			made to its advice and how best to communicate that advice to consumers.
	Which?	This needs to include a much greater focus on ensuring responsible promotion of SSBs and products high in free sugars, including price promotions and controls over marketing of foods to children. PHE should work with the Department of Health to establish targets to lower levels of free sugars in products that contribute significant amounts to dietary intakes, building on work previously undertaken by the Food Standards Agency. The sugar content of foods also needs to be made clearer on food labels through wider take up of traffic light nutrition labelling by food manufacturers as well as retailers and responsible use of health and nutrition claims.	PHE is currently considering the evidence in relation to a number of potential actions that could be taken to reduce sugar intakes, in line with the 'Sugar Reduction: Responding to the Challenge' document published in June 2014. This includes a review of the evidence on fiscal measures, and marketing and promotions, targeted at reducing sugar intakes and the resultant impact on attitudes, consumption and health. This programme of work also includes supporting the Department of Health in working with the food and drink industry through the Government's Public Health Responsibility Deal. This package of evidence will be used alongside SACN's finalised recommendations, to provide advice to the Department of Health to inform government's thinking on sugar in the diet.
	Ms Carol Williams and Dr Peter Watt	Using a precise and comprehensive definition of free sugars in the SACN report is important because this will underpin the translation into public health guidance, including consideration of what fruits should be included in campaigns such as '5-a-day', and what cooking skills should be included in curricula delivering healthy eating interventions. The decision to include fruit juice in the original '5-a-day' in 1994 was in part attributable to the low consumption of any fruit by the population, and	PHE is considering the implications of the recommendations in SACN's draft report for its advice on what makes up a healthy diet. Once the report is finalised, PHE will decide what, if any, changes need to be made to its advice and how best to

	Submitter	Comments	Response to comments.
		based on an understanding that fruit juice had a better nutrient profile than fizzy drinks . The current food landscape is much changed and a clear message of the benefits of consuming whole foods, where the shape and cell structure of the source fruit/vegetable is recognisable, is timely. This will also help achieve increases in consumption of dietary fibre as recommended in the SACN report. We note that the invitation is specifically for comments of a scientific nature; the translation into practice will be led by Public Health England after finalisation of the report. However, we are concerned that consideration of the science in isolation from practice may have negative consequences for public health messaging and implementation. We suggest it would be instructive for SACN to be involved in an interactive consideration with PHE and other stakeholders regarding the translation of the recommendations into public-facing guidance prior to release of the final SACN report.	communicate that advice to consumers SACN's role is that of risk assessment. It is the role of PHE and other Government bodies to take risk management decisions based on an understanding of SACN's risk assessment advice.

Table 11: Comments from consultation submission by Dr Geoffrey Livesey

Reference	Comment	Action agreed by SACN
page 2 First paragraph	The draft Report is not presented in a useful, easy to read or helpful format, with too much information about literature search (which is repetitive, tedious to read and mostly unnecessary to state) and not enough about the context or conditions of peoples to which the results apply.	SACN recognises that there are many ways this activity could have been executed, and within the method chosen, many additional alternative approaches to the selection, analysis and interpretation of evidence could be entertained. SACN respects that the respondent may have made different choices; however all of the alternatives were carefully deliberated by SACN during the course of the work.
Page 4 1.3	"Due to the wealth of data available and because of the concerns around their limitations, case-control, cross-sectional and ecological studies were not considered. Only prospective cohort studies and randomised controlled trials were considered for this report. ". • The statement admits to not examining the totality of evidence. Scientific reasons for not doing so are not presented; administrative reasoning alone is of questionable acceptability. • The opening statement appears in stark contrast with the conclusions, which often indicate there is limited evidence or insufficient data (which calls for updating of the literature search). • A more appropriate rationale would simply be one that seeks the highest levels of evidence according to study design, a rationale that is widely accepted. • Where limited evidence is found after systematic search (not older than 6 months), it is inaccurate to draw any conclusion yet there are several instances where such inaccuracy arises. The category of insufficient evidence as proposed would be appropriate but is too seldom used, downgrading of evidence would be appropriate.	The respondent has misinterpreted the statement, which is intended to mean that inclusion of case-control, cross-sectional and ecological studies would have led to 'a disproportionate volume of evidence of poor quality'. The limitations of this kind of evidence are well-known to the expert community. SACN is unable to comment without specific examples of the 'inaccuracies' mentioned by the respondent.
Page 4	"Evidence on adverse effects of very high intakes of specific carbohydrates, e.g. gastrointestinal symptoms, was not part of the remit	The literature was evaluated for primary outcomes related to nutritional (health) outcomes, which can include

Reference	Comment	Action agreed by SACN
1.3	of this report." • Consideration of "adverse effects" is an essential part of any assessment of benefits since at a national and individual level the risk of adverse effect can be persuasive of no overall benefit. • The statement leaves open whether or not adverse effects other than gastrointestinal ones sometimes mentioned arise. If it is intended to not mention adverse effects, a rationale should be provided; the administrative "remit" is of questionable acceptability. • If adverse effects are to be considered elsewhere, such as a committee on toxicology, this ought to be the rationale given for the non-considerations.	adverse effects on these and thus disease risk. However, issues of safety are considered by other committees' e.g. Advisory Committee on Novel Foods and Processes (ACNFP) and the Committee on Toxicity (COT).
Page 5 1.4	"These [reviews] were based on literature published through December 2009, November 2010 and January 2012, respectively." • This range of years is too out of date to be representative or even systematic. January 2012 is 2.5 years ago. It is well recognized that such reviews should include at least up to the last 6th months of publications and aim to include later ones wherever possible, eg. Update just prior to going to press. A cumulative meta-analysis is essential to assess the stability of effects and associations, but there is no evidence of any having been performed.	The need for extensive post-search evaluation and consultation precludes the process described by the respondent. SACN members were able to bring subsequent relevant papers to the Group's attention and the consultation process presented an opportunity for other recent and older papers to be considered. A cumulative meta-analysis can be used to show where the evidence is directionally shifting over time, but was not essential. Furthermore, such trends if present can be qualitatively discerned from the forest plots in the background reports, in which the studies are in chronological order.
Page 5	"[Last search dates of] January 2010…December 2010…February	SACN members were able to bring subsequent relevant

Reference	Comment	Action agreed by SACN
1.5	2011…June 2012” • Again, these are the last search dates and are insufficiently up to date to demonstrate the results are current or representative of the available literature.	papers to the Group’s attention and the consultation process presented an opportunity for other recent and older papers to be considered.
Page 5 1.5	“the update search was not a systematic review” • What does this mean? Either the Report accepts systematic review or it doesn’t. • Systematic reviews should be described either as meta-analytical systematic reviews when meta-analyses are conducted or narrative systematic reviews when there is insufficient data for meta-analysis.	The update search applied the same systematic search criteria, and these were also applied to any papers raised separately by SACN members or consultation respondents. SACN feels the distinction between meta-analytical and narrative systematic reviews is adequately reflected and communicated in the report.
Page 5 1.5	“After this cut-off date additional studies were considered only if they were thought potentially to impact on or inform the conclusions drawn in this report.” • Data from all relevant studies should be included before drawing a conclusion. • The Report includes the nonsense statement quoted here above. One is obliged to consider the data to be able to think whether the additional study could impact on the conclusion drawn and so reconsider the conclusion. Moreover, without the attendant search, critical publications might be missed. The procedure as adopted allows reporting bias to be introduced into the Report’s conclusions. In a systematic meta-analytical review one can only disregard the recent studies if a cumulative meta-analysis has found prior stability for the conclusion reached and I^2 is non-significant and near zero, even this is not ideal.	A systematic approach was taken insofar as logistically possible. Beyond this, as with the interpretation of the evidence, SACN necessarily relies on expert input in the process. While 'bias' cannot be excluded, this is mitigated by a foundation of systematically collected evidence and application of the same criteria to newly-arising evidence, and further mitigated by the number of experts involved and oversight by the full SACN committee. The consultation period also provides an additional opportunity for the interested, expert community to highlight possible evidence that might have been overlooked or inappropriately interpreted.

Reference	Comment	Action agreed by SACN
Page 5/6 1.5	"This was particularly the case where there was limited evidence or when it was difficult to interpret how evidence from the update search affected the conclusion." • The first part of the statement is ambiguous. Please be clear about what was limited, the data already considered, the data in total with the most recent study/ies, or the data in the most recent study/ies? • The second part of statement appears bizarre. If it is not known how a new study affects the conclusion, then no conclusion can be reached.	SACN thanked the respondent for their comments; however stand by the statement as written in the report.
Page 6 18.1	Interpretation of cohort studies • The Report does not provide an unbiased statement. Comments in the Report describe the weaknesses of cohort studies, yet few strengths are reported; one has to get to the subsequent para to find a strength, then it seems only one is given.	The strengths of studies are for the most part inherent in meeting the inclusion criteria. SACN did not consider it necessary to repeat these throughout the report.
Page 6 18.1	Interpretation of interventional studies • The opening statement leaves it unclear about what to do when the disease is defined by metabolic or physiological states, e.g. blood glucose and diabetes, hypertension and high blood pressure. • The examples as given in this section of the Report are particularly poor. Variation in nutrient compositions which differ among studies might simply enable meta-regression to adjust for potential confounding. In this section of the Report there are few strengths and weaknesses considered attribute to RCTs. A key weakness of long-term RCTs is the convergence of regular and treatment diet interventions, which may arise when participants the treatment arm learn via the grape-vine that a treatment diet might have some benefits. It is never clear how soon that convergence might arise	The statements are not intended to be an exhaustive list of potential issues that may affect the outcomes and interpretation of cohort or intervention studies, which will be well-known to experts.

Reference	Comment	Action agreed by SACN
	making a no-effect conclusion open to doubt. • The last sentence in the para is hard to understand. Does "total carbohydrate" mean the total of available carbohydrate or does total carbohydrate include unavailable carbohydrates. Or is the author of the sentence trying to say that the definitions of carbohydrate are often unclear, and can sometimes be Available carbohydrate and sometimes Total carbohydrate (including dietary fibre) or other definition, or is there some implied reference to variation in carbohydrate intakes often being accompanied by variation in fat intake?	The statement is referring to the fact that meaningful changes in the carbohydrate component of the diet cannot be executed or readily interpreted independent of changes in the total or proportion of the diet derived from other macronutrients.
Page 6/7 *****A2.7	"fixed effect model was used" "should" • The present reader is surprised at speculation in A2.7 that assumes subgroups within a research centre would not differ. • Indeed that a research centre present results for subgroups separately is because they hypothesize differences (might) exist. One type of within laboratory subgrouping mention in A2.7 is for men and women, who can (and often do) respond differently to diet within each research centre. If a population mean is needed then random effects ought to be used to combine data. However, if meta-analysts really wish to achieve the correct reduction in heterogeneity, then the outcomes should be modelled appropriately. In the case of gender differences this can be achieved using a zeroed centred 'covariate', that is the fraction of the population sample that is one sex or the other male zeroed for mixed sex (i.e. zeroed on 0.5). Then the meta-analysts will be able to combine observations for the different sex groupings (male population data, female population data, and mixed-sex population data of varied sex ratio). The results will have the correct reduction in heterogeneity and obtain additional information about the size of difference between sexes.	It was inappropriate to have made the bold claim that there shouldn't be any heterogeneity within the same study. However, results for men and women were only combined where this is what most of the other studies did. To keep results for males and females separate would have led to exclusion of many substantive studies that only presented combined results. So whilst separate results for males and females could be combined and included, studies which presented combined results could not be divided. Just because one study did split results for males and females doesn't necessarily imply that there were differences between their responses. The fact that most studies presented results combined rather than separate suggests that the consensus is for similar results for men and women. Amongst those presenting results for men and women combined, most heterogeneity appeared to be between rather than within-studies. Furthermore, for the studies that combine results in one model, this is a fixed effects analysis. Using fixed effects to combine males and females is consistent with what the other studies have done in presenting combined

Reference	Comment	Action agreed by SACN
		results. The suggestion of combining results for men and women with random effects first, rather than fixed, is reasonable, but unlikely to substantially alter the results or conclusions given that the majority of studies already provided estimates for men and women combined. For example, picking the review with the largest number of results split by sex, the updated review of dietary fibre and total CVD with 5 of the 10 studies presenting split results. 3 of those 5 studies have negligible between-sex heterogeneity (I2 less than 20%). Using random effects to combine males and females for all 5 gives exactly the same pooled estimate and confidence intervals for the association (to 3 significant figures) as using fixed effects. Including a zero centred covariate for proportion of females, for example, would necessarily exclude studies not presenting this information, and would use up one more degree of freedom. Given that most studies generally did not consider this an important source of heterogeneity, presenting results for males and females combined, SACN prefers exploration of differences between males and females as a secondary sensitivity analysis. The approach used to do this was to present results for men and women separately in subgroup analyses, and test for difference in estimates between these groups, highlighting where there were differences, so the reader can identify for themselves whether results support different responses from men and women. Although a more established method than the one suggested was used, SACN considers that this issue has been fully and properly addressed, and that the results would be the same using alternative methodology.

Reference	Comment	Action agreed by SACN
Page 7 A2.8	The criterion (I^2>75%) "It was agreed that if the result produced an I^2 of more than 75%, the pooled estimate would not be presented because it indicates that there is excessive heterogeneity and the result would have little meaning." • The criterion would exclude outcomes with a large heterogeneity even if all results were in the same direction and have a large effect. In other words, could exclude important information about health with a size of effect/association that is conditional to subgroups and covariate domains (which could be hidden by the procedures in A2.8). The criterion would also include studies perceived originally as large (adequately powered) but in practice were imprecise due to error attributable to large-study inefficiencies. • It is always better to present the result, and speak to the caveat. The alternative risks assertions of lack of transparency (such as made here) and prevents retrospective re-consideration of the result when/if appropriate. Being transparent also treats outcomes with I^2 of 74% and 76% the same, difference between the two would be entirely arbitrary and unwarranted.	The text refers to high I-square precluding use of the pooled estimate value itself, not the Forest plot or data from individual studies. The situation the respondent describes ("When the I^2 is greater than 75%, but the forest plot suggests there is evidence of a directional effect...") is considered in the SACN grading system, and allows for a directional conclusion to be made despite high I-square value. The respondent is correct that 75% may be considered an arbitrary value (as is a p-value of 0.05). As noted, the grading system allows for expert judgment to be applied, and where this was done it is appropriately described in the report.
Page 7 A2.10	Conversion of NSP to AOAC fibre and vice versa • It is good that this discrepancy is highlighted, and that it has been addressed in the evidence base. Perhaps better still would have been a dummy covariate centred on AOAC (AOAC=0, NSP=1), which would have informed about the size of difference between the two fibre analysis approaches and whether the results were significantly different; this without having to implicate any doubtful conversion factor, which might be inaccurate for a population instant.	SACN agrees with the respondent that the method used to measure fibre (AOAC or NSP) is important to take into account, and thanked them for suggesting an alternative way of doing this. SACN prefers the approach used in the report because firstly most studies used AOAC, and so it made sense to convert to this, secondly incorporating an additional covariate would have used up an extra degree of freedom, thirdly an interaction term between the dummy variable for method and the measured fibre intake would have been required, because it is not just a shift in intake, but a whole different scale. This would have used another degree of freedom again, and the

Reference	Comment	Action agreed by SACN
		simplest interpretation for nutritionists would have been the present results as subgroup analyses (AOAC and NSP), which is what was done. There is not much difference between what the respondent suggests and what was done in the report.
Page 7 A2.16 & A2.17	The difference between the two paragraphs is not adequately drawn to the eye.	It is clearly stated in the report that the respective paragraphs refer to cohort studies and to randomised controlled trials.
Page 7 A2.21	"relative risk above 1.2 for greater risk or below 0.8 for decreased risk" Unclear, take RR=1.2, does this mean say 1.2 over 5 quantiles, 1.2 over one quantile or 1.2 over 1SD or 1.2 over a targetable range of intakes irrespective of habitual range of intake, or something else?	SACN thanked the respondent for their comments. This text has been amended to read 'for an agreed increment of intake (one standard deviation of intake as determined by dietary surveys).'
Page 7 A2.22	"No conclusion- insufficient evidence. & No conclusion- inconsistent evidence." • The first of these categories is not applied sufficiently often (problem suspected is in the definitions developed for attribution). • What is meant by inconsistency here, does this mean probable heterogeneity or something else?	SACN is unable to respond without specific examples of where the respondent believes "no conclusion, insufficient evidence" should have been applied but was not. Inconsistency was judged where there was in principle sufficient evidence (study data) to draw a conclusion, but the outcomes of the studies were simply too variable (with regard to direction or presence of an effect or association) to allow a conclusion to be drawn.
Page 7/8 A2.23	"normal diet" • What is a normal diet? • There is no specification here, but something possibly like it does appear in the main article.	"Normal' is used here in a colloquial sense, i.e. not reflecting or requiring dramatic deviations from prevailing, readily available food sources.

Reference	Comment	Action agreed by SACN
Page 8 A21 to A2.23	• All is written in the past tense. Likely, all would have been written in the future tense if written and agreed beforehand. This suggests some deviance in presentation, and for what purpose? • It is unclear whether data from the prospective cohort studies were appropriately transformed before meta-analysis. At least some were it seems after rendering some of the evidence base. • There was no identification of the cause of curvature in dose-response studies as reported. Such can arise because of inequality of the dose range among studies. In such case, further evidence of non-linearity is essential; otherwise there is a real possibility that the meta-analysis will have underestimated heterogeneity (hidden it in the curvature). Curves are shown for dietary fibre dose, yet the data considered by IOM was linear. • There is no evidence that individual studies were assessed for significant or even visual nonlinearity. If linearity is indicated at the level of individual studies, then two-step meta-analysis would be appropriate (i.e. dose-response with linear trend within study, followed by meta-analysis with or without covariates to the combined trends).	The past tense reflects that conclusions were drawn after considering the currently existing evidence. SACN is unable to respond without specific examples of where the respondent believes the analysis is flawed. Results presented in the Carbohydrates and Health report all assume linear trends. Given the vast breadth of the report, and the number of meta-analyses contributing to it, there was not scope to explore the shape of any associations beyond this. In some of the spin-off papers, the Leeds Team were able to go into more depth; however any suggestion of curvature has to be interpreted somewhat cautiously and apparent curvature may often be the result of different dietary assessment methods used in different studies. Methods that over-estimate intake will stretch further along the exposure axis, whilst the estimates are much the same. This can impose an apparent curve on the data. Similarly at the lower end of intake. SACN was careful not to over-interpret such curvature, nor test for it. Assessment of nonlinearity in individual studies is a good idea, but it was impractical on the scale of this report. However, where nonlinearity has been tentatively explored in spin-off papers, results of the individual studies are generally reported in a table, so informal assessment can be made. SACN hesitates to agree to two-step procedures based on testing for nonlinearity, as this can lead to over-fitting of models and the tests tend to have a high type I error rate.

Reference	Comment	Action agreed by SACN

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*****
Literature selection and data analysis in the evidence base
	• The body of the Report is unclear about methodology used, as often noted in the forgoing.
	• Examination of data analysis details in the evidence-base reveals a number of issues that are surprising. It is essential that meta-analysis results are corrected to avoid finding an effect due to bias towards low combined errors.
	• Studies are excluded when “less than one year in duration” or “have not prescribed ad libitum dietary regimen”.
	However:
	  • There are several weight loss trials referred to in the main body of the text / appendix that are from 6 weeks to 6 months duration.
	  • The same criteria might well apply to food intake /energy intake and satiety trials when these are used to make inferences about obesity, but this has not been adhered to.
	• Excluded are interventions that use a dietary portfolio (combination diet) or mixed component regimen, e.g. the prescribed diet included plant sterols, soy protein, viscous fibres, and nuts etc. or studies that do not permit the effect of carbohydrate/carbohydrate type to be evaluated
	  • This is not always adhered to with respect to sugars, some of which are accompanied by modified fat intake.
	• Scoring for study quality is not defined.
	• Body weight can be in the causal pathway but is always considered in the Report as a confounder, it might not be.
	• It is claimed that “Our aim is to undertake a meta-analytic approach where possible, but we will take into consideration the nature and magnitude of the evidence base and the extent of heterogeneity in the data”.
	  • However, while heterogeneity was evident in most analyses, there are numerous instances (if the protocol has been adhered to) where heterogeneity has been excluded from the overall error term (or 95%CI for effect/association) for combined
		SACN is unable to respond without specific examples where the respondent believes studies not meeting the criteria have been used in drawing conclusions, without justification.
		
		SACN is unable to respond without specific examples where the respondent believes studies have been inappropriately included or interpreted.
		
		SACN is unable to respond without specific examples of where body weight was considered a cofounder, and where the respondent believes this has significantly influenced the conclusions of the report.
		
		SACN thanked the respondent for highlighting this typographical error in the protocol. Random effects was used throughout because, as the respondent suggests, there are many potential differences in the design and conduct of the different randomised controlled trials. SACN agrees that this is a particular problem in nutrition trials. As the respondent correctly notes, when there is no

Reference	Comment	Action agreed by SACN
	effects/associations. These are when heterogeneity I^2>0 to 100 is assumed zero by protocol thus it is stated: • ******"Fixed effects meta-analysis will be used for randomised controlled trials". Unless there is zero heterogeneity, this is not the right thing to do, more especially in nutritional studies with many real and potential differences among RCTs: This is because the fixed effects then bias the combined error term towards zero and so can result in finding 'significant effects' when no significant effect has arisen.	heterogeneity, the results of fixed and random effects meta-analysis are the same, and heterogeneity was low surprisingly often. But where heterogeneity was high, estimates should be interpreted very cautiously, whether or not they are derived from fixed or random effects. SACN tried to convey this throughout the text in the report. Paragraph 10.3 page 13 of the protocol now states, *"For each specific exposure a decision will be made whether or not to proceed to formal meta-analysis based on the number of useable studies. We will only consider pooling estimates using meta-analysis, where there are at least 3 cohort studies or 3 randomised controlled trials with identical outcomes and exposures, and where there is not excessive heterogeneity. Summary estimates will be prepared for each study design separately, and these will be displayed on separate forest plots. Random effects meta-analysis will be used for meta-analyses of randomised controlled trials and for observational studies because of the large potential for between-study heterogeneity[25,27]. Results will be interpreted and reported in a manner interpretable by non-statisticians familiar with the subject matter."*
	• I^2 >50%" is purely arbitrary, this whatever 'experts' have done this beforehand. They too need to consider what they have done. Nutritional studies cannot be considered like drug studies, and drug studies are known to have biases. • "I^2 …more useful proportion of total variation" Sometimes tau^2 is more useful, I^2 is more useful for tests because it is more precise that tau^2. • "lack of information" allowing individual studies to be excluded. It is customary to write to authors of original studies to acquire the missing data. To not do so is to not maintain necessary standards, and risks useful information being lost as this activity is deferred to	I^2 >50% was the value chosen on the basis of statistical advice. SACN agrees it is good practice to contact authors of existing publications to request necessary information not included in publications, and to establish if any results exist for outcomes or exposures not included in the

Reference	Comment	Action agreed by SACN
	the next (later group) undertaking a meta-analysis (when original authors might by then have lost access to information).	publication. It is also good practice to contact research groups known to be active in the field, to request details of any unpublished results. For a one-off meta-analysis this would have been done to maximise the amount of evidence for review and to minimise potential for publication bias; however on the scale this report, including many hundreds of combinations of health outcomes and carbohydrate-related exposures, leading to nearly 200 individual meta-analyses, covering a very wide range of dietary exposures and clinical outcomes, this was not feasible. Much of the observational data reviewed was of a historical nature and would not be easily accessible, almost certainly less so than randomised controlled trial data where there is greater requirement for access to data. For pragmatic reasons the team who conducted the meta-analyses made the restriction to use only published data in this case. Authors for some of the spin-off papers were contacted; however data was often no longer available and most did not reply. Furthermore, the Leeds Team who conducted the meta-analyses explored the potential for small study effects, such as missing data leading to publication bias, using funnel plots.
Page 9 ****** Chapter 4 Diabetes.pdf Figure 4.8, Funnel plot	Chapter 4 Diabetes, figure 4.8, funnel plot "There was no evidence of any small-study effect such as publication bias, as is shown by the contour-enhanced funnel plot below: Figure 4.8 Contour-enhanced funnel plot for publications presenting incident diabetes mellitus type 2 and dietary fibre" • The plot is confusing— because the plot indicates (contrary to the	The contour-enhanced funnel plot can be confusing if the reader is more used to the standard funnel plot, but it was used because the location of the observations compared to the contours helps distinguish publication bias from other causes of asymmetry. Using a contour-enhanced funnel plot, if the area where

Reference	Comment	Action agreed by SACN
	Report's statement quoted) that there is massive publication bias but this is due to the pseudo-confidence bounds being plotted about zero association; this rather than correctly about the combined mean.	studies are perceived missing is within the region of low statistical significance (e.g. p>0.1) then it is more reasonable to consider publication bias as the potential cause of asymmetry. This is particularly helpful for observational studies where small-study effects may easily have causes other than publication bias, e.g. if smaller studies have better dietary assessment (e.g. weight food diary or biomarker rather than FFQ) or better monitoring of outcomes (e.g. confirmed rather than self-reported diabetes). It is important to note the differences between the pseudo 95% confidence limits produced by a standard funnel plot and the contours of statistical significance produced by a contour-enhanced funnel plot. In particular, the contour-enhanced funnel is centred around the null rather than the pooled estimate. Symmetry is therefore not about whether the observations follow the contours of significance, but simply that the observations themselves are symmetric (around the pooled estimate). The pooled estimate could have been included on the plots to make this easier for the reader, but these are provided in the text and forest plots. In the example quoted (figure 4.8) the observations are symmetric around the pooled estimate, hence no evidence of asymmetry. It is important for the respondent to remember that it would not be expected for them to be symmetric around the null, unless the pooled estimate was of a null association. The respondent is referred to Peters et al. (Journal of Clinical Epidemiology. 61: 991-996) for more explanation.
	• Trim-and-fill analysis is preferable to Eggers plot, the hypothetical 'missing' or 'filled data' and 'filled mean' can be shown, too, together with the adjusted combined mean and test of significance of bias	SACN prefers not to use the trim and fill method beyond an aid to identifying asymmetry. The "filled data", and "filled mean" derived from it, are subject to strong

Reference	Comment	Action agreed by SACN
	when residuals are analysed). • It is seldom done, but the pseudo-confidence bounds ought also to be presented for the random effect analysis, too, whenever $I^2>0$ whether or not I^2 is significant.	assumptions, in particular that the smaller studies are subject to publication bias and the larger ones unbiased. That is not always the case for observational data, where a more complex picture may be true, with smaller studies potentially subject to publication bias, but larger ones subject to greater measurement error bias, for example. Moreover, the trim and fill method has been shown in simulation studies to detect '"missing" studies more often than it should. Using trim and fill can mean "filling in" non-existent studies and the "filled mean" may adjust for non-existent studies in response to nothing more than random variation. This is a helpful suggestion for standard funnel plots where the pseudo confidence limits are usually centred on the fixed effects estimate, so are potentially subject to bias. For the contour-enhanced funnel plot, however, the contours show levels of statistical significance for the individual studies, and so are independent of the pooled estimate and whatever method has been used to derive it. So if the pooled estimate is biased, this does not affect the contours. But the main point of the contour-enhanced funnel plot is to help decide whether observed asymmetry is likely to be because of publication bias, and that's particularly important for the many observational studies reviewed.
Page 10 ***** Chapter 4 Diabetes.pdf Figure 4.10,	**Chapter 4 Diabetes.pdf Figure 4.10, Funnel plot:** • The plot has the same problem as mentioned above for Figure 4.7 in the same pdf. • All funnel plots released need to be checked for correct construction and drawn to be correct and informative without confusing the reader.	SACN refers the respondent to the above comments.

Reference	Comment	Action agreed by SACN
Funnel plot:		
Page 10 ***** Chapter 4 Diabetes.pdf	**Chapter 4 Diabetes.pdf "Please interpret observational data with caution: With observational studies there is substantial potential for biases."** • The Report's statement in itself is biased because nutritional intervention studies also have considerable potential for biases. • The more general and well accepted caution is sufficient, that observational studies are not sufficient to prove causality. • Observational studies provide what one hopes is the best estimate of risk. This is the best one can do also with RCTs when measurements are risk factors, but even then risk is often not estimated but is unquantified and only inferred as important. Quite possible the Observational studies are the more transparent of the two. • RCTs to test diets for incident diabetes or incident colorectal cancer may well be impractical and unethical if diabetes type 2 and colorectal cancer take the generally accepted 10 or 20 years for development. All this leaves RCTs being ideal theoretically but doubtful practically when starting with heathy participants. Starting with diseased participants one can at least begin to monitor progress, such is the advantage when examining drugs. • A less biased perspective towards favouring RCTS over Observational studies would be appropriate for the measures made among studies in this draft report.	SACN considers the statement to be appropriate. It is not entirely correct that observational studies are not sufficient to prove causality, since they are sufficient to show for example that obesity and alcohol cause various diseases. SACN thanked the respondent for their other comments.
Page 10/11 ***** Chapter 4 Diabetes.pdf	*****Chapter 4 Diabetes.pdf Figure 4.10, Forest plot for glycaemic index and Diabetes type 2. • The plot and conclusions are inaccurate—see next.	The funnel plot in figure 4.10 is for cereal fibre, whilst the forest plot in figure 4.19 is for glycaemic index. The funnel plot relating to glycaemic index is presented in figure 4.20, which is consistent with the statement that half the studies were not significant. It is important not to be

Reference	Comment	Action agreed by SACN
Figure 4.10, Forest plot	Chapter 4 Diabetes.pdf, figure 4.10, Funnel plot "There was a little evidence of possible small-study effect from the contour-enhanced funnel plot, though half the studies did not suggest any evidence of a protective association." • The statement strongly indicates the authors lack an appropriate ability to present and interpret funnel plots (see above comments). • In addition, the claim made is contrary to the observations in Figure 4.19. • There is also a failure to account for adequacy of the FFQs for carbohydrate among these studies. Meyer et al 2000, Stevens et al, 2002, Mosdol et al 2007 and Sahyoun et al 2008 all had inadequate FFQs. If an FFQ has poor correlation for the amount of carbohydrate in food, its use will cause heavy biased towards the null. Interestingly these are the studies that found no significant effect.	drawn into thinking that the studies should be symmetric about the null just because this is the point at which the contours meet. Instead, they should be symmetric around the pooled estimate. The contour-enhanced funnel plot is used to assess the possibility of publication bias, and figure 4.20 is a good example of how that can work. Whilst there was a little evidence of asymmetry, the fact that half the studies were in the non-significant zone of the funnel plot somewhat suggests that any asymmetry here is not likely to be because of publication bias. That's because publication bias would tend to under-report the non-significant results. The contour-enhanced funnel plot suggests that this is not the case in this example. SACN agrees with the respondent that meta-analysis of observational studies is prone to the same biases as the individual studies it includes, and was careful to state this throughout the report. If the dietary assessment of the main exposure is subject to large measurement error, then the estimate may well be (but not necessarily) biased towards the null; however some strong associations were still identified. The view on which dietary assessments are adequate and which not, is largely subjective, SACN opted not to exclude on the basis of study quality. Many would argue that no FFQ is adequate to the task. In meta-analysis of observational studies it is not usual to exclude on this basis. Furthermore, formal assessment of the many hundred observational studies identified was beyond the constraints imposed on the review process. However, information is available in the tables provided, and some of the spin-off papers assessed quality of the dietary assessment tool, including those in the papers cited.

Reference	Comment	Action agreed by SACN
	• The last study reported is 2008, why are there no studies of later date? Remember too that there are problems in the EPIC studies, with FFQ needing to be validated within each region, and difficulty of small numbers in each region, which limits the number of adjustments that can be made.	The cardio-metabolic health review is based on literature published through December 2009. No studies were identified which were published between 2008 and December 2009 and which met the inclusion criteria for the review. However, to ensure the report was not out of date an updated literature search was performed using the search terms provided in the cardio-metabolic health review from January 2010 up to June 2012.
Page 11 ***** Chapter 4 Diabetes Incident Diabetes Mellitus type 2 and glycaemic load.	**Chapter 4 Diabetes Incident Diabetes Mellitus type 2 and glycaemic load.** • The section and analysis are out of date. • The conclusions reached are inaccurate. • A comprehensive meta-analysis of the relation between diabetes type 2 and glycaemic load is available (Livesey et al 2013 ab [3, 4]).	SACN thanked the respondent for the reference to the recent meta-analysis of association between glycaemic load and type 2 diabetes mellitus risk; this is helpful and reinforces the conclusions in the draft report.
Page 11 ***** Chapter 4 Diabetes.pdf	**Chapter 4 Diabetes.pdf** • Some of the combined outcome results for observational studies are inaccurate beyond the draft Report's meta-analyst expectations. • None of the combined outcome results of observational studies take account of the adequacy of the FFQ for optimal reporting quantitatively and could have done so. Thus none of combined outcome results are likely to be accurate. This includes also the subgroup analyses.	The view on which dietary assessments are adequate and which not, is largely subjective, so SACN opted not to exclude on the basis of study quality. Many would argue that no FFQ is adequate to the task. In meta-analysis of observational studies it is not usual to exclude on this basis, but it is important to note that the pooled meta-analysis is no better than the quality of the research on which it is based. However, formal assessment of the adequacy of the many dietary assessment tools for each of the many hundreds of dietary exposures reported in

Reference	Comment	Action agreed by SACN
	• All meta-analyses of intervention studies should have weighted studies according to random effects, which become fixed as I2 becomes zero. Instead it is indicated in the Data Analysis section that fixed effects were applied. Whenever I2>0, even by a small amount, the use of fixed effects causes a bias in the combined mean and error size favouring towards a significant effect. • Consequently, extreme caution should be taken when applying results from this Report, whether for intervention studies or for prospective cohort studies. • These problems affect all chapters • The only solution is to update and redo the analyses.	the many hundred observational studies identified was beyond the constraints imposed on the review process. SACN thanked the respondent for highlighting this typographical error in the protocol. Random effects was used throughout because, as the respondent suggests, there are many potential differences in the design and conduct of the different randomised controlled trials. SACN agrees with the respondent that this is a particular problem in nutrition trials. As the respondent correctly says, when there is no heterogeneity, the results of fixed and random effects meta-analysis are the same anyway, and heterogeneity was low surprisingly often. But where heterogeneity was high, estimates should be interpreted very cautiously, whether or not they are derived from fixed or random effects. SACN has tried to say this throughout the text. Paragraph 10.3 page 13 of the protocol now states, *"For each specific exposure a decision will be made whether or not to proceed to formal meta-analysis based on the number of useable studies. We will only consider pooling estimates using meta-analysis, where there are at least 3 cohort studies or 3 randomised controlled trials with identical outcomes and exposures, and where there is not excessive heterogeneity. Summary estimates will be prepared for each study design separately, and these will be displayed on separate forest plots. Random effects meta-analysis will be used for meta-analyses of randomised controlled trials and for observational studies because of the large potential for between-study heterogeneity[25, 27]. Results will be interpreted and reported in a manner interpretable by non-statisticians familiar with the subject matter."*

Reference	Comment	Action agreed by SACN
Page 11/12 Chapter 2. Classification, biochemistry, absorption, metabolism and definitions of carbohydrates **** 2.1, Table 2.1 Sugars (DP1-2) and sugar alcohols/ polyols	• Table 2.1 of the draft report includes an error that was present in the 1998 WHO/FAO report and is reproduced (perpetuated) by commissioned authors Cummings & Stephens in the WHO/FAO scientific update in EJCN 2007 [5]. The error was corrected with the recommendation from FAO/WHO (2003) (page 76) [6]. in their report on Food energy and analytical methods Stating “The term ‘sugar alcohol’ should be phased out of food labelling and replaced with ‘polyol’. Polyols should be recognized as carbohydrates, but not sugars”. Subsequently, without reference to WHO/FAO (2003) [6], a WHO/FAO commissioned paper from Englyst, Liu & Englyst 2007 [7]. provided a correct tables of carbohydrate characteristics in regard polyols, • This underlies why polyols are permitted in sugar-free products, because they are not sugars. • Ployols are not always DP 1-2 and can be DP>2, for example polyglycitol, and maltitol syrups. • The correct classification places polyols apart from sugars as a 4th category among carbohydrates (FAO/WHO 2003)[6, 7]. (see Annex 1) • To emphasize, none of the Sugars definitions provided by the UK, USA, WHO and EU include polyols (cf also Table 2.4 of the draft Report). • Polyol(s) is the preferred term on food labels as used in the UK, USA, and Europe Australia, New Zealand, and elsewhere. Sugar alcohol though still used occasionally in the literature is becoming archaic. • Limits for intake set for polyols differ from the limits set for sugars, emphasizing again the importance of not confusing polyols with sugars. • An advisory is mandatory in labelling on excessive intake of polyols, but not for sugars.	SACN thanked the respondent for highlighting these errors. Polyols have been included as a separate entry in table 2.1. The term ‘sugar alcohol’ has been replaced with ‘polyol’, and a comment has been added to the glossary of terms linking polyol to sugar alcohol. SACN thanked the respondent for the other information about polyols; the final report is unambiguous in its description of them.

Reference	Comment	Action agreed by SACN
Page 12 **2.2	**2.2 “In 2006/7, an FAO/ WHO update on some of the key issues relating to carbohydrates in human nutrition endorsed the primary classification recommended by the 1997 Expert Consultation,” • It is incorrect to say FAO/WHO “endorsed” the classification. This was not a full consultation that allows attribution to FAO/WHO, rather indeed the perpetuated error is attributable to the commissioned authors and perhaps the manuscript referees. It is only the general concept of categorisation by size that remained acceptable to FAO/WHO 2003 [6], who recommended polyols be categorised correctly (see comments above at 2.1).	SACN thanked the respondent for highlighting this point; the text has been amended to read ‘In 2006, a review commissioned by FAO/ WHO on some of the key issues relating to carbohydrates in human nutrition endorsed…’
Page 12 2.4/1	“Chemically combined” • Chemically combining fructose and glucose does not always lead to sucrose. The sentence needs modification.	SACN thanked the respondent for highlighting this point; paragraph 2.4 has been reworded to clarify the meaning.
Page 12 2.5	“which are three, four and five sugar polymers respectively” • Potentially confusing when polymers in nutrition are defined DP>9	SACN has used the word correctly in terms of the number of molecules that are included in the polymerised molecule. It is not felt that there is any benefit in having mon-, di-, oligo and polysaccharides and that greater clarity would be achieved to combine the oligo- and poly- in a single category, especially if the oligo- molecules have effects on the person which would allow them to be categorised as fibre.
Page 13 Chapter 2	• Xanthan gum is now an appreciable part of ‘gluten-free’ carbohydrate foods and other foods. It is not considered in this chapter. Indeed, without reason, all nsp from a similar *eg bacterial) source are not considered in this sections of the draft Report.	Gums and gelling agents are considered in Annex 5 of the report.
Page 13 2.12	[Soluble and insoluble dietary fibre]. • It would be worth noting the FAO/WHO (2003) recommended	SACN thanked the respondent for this comment; the

Reference	Comment	Action agreed by SACN
	discontinuation of this classification of dietary fibre. It is also not preferred in the USA but exists historically. Does this mean the ref should be (FAO/WHO 1998, 2003).	reference has been amended.
Page 13 2.17	"transported to the liver" "glycaemic carbohydrate". "immediately" • Omits to say that liver is not absorbing most of the carbohydrate, as might be implied from the text at present. • The term glycaemic carbohydrate is undefined and not recommended over available carbohydrate (FAO 2003).	The term glycaemic carbohydrates is widely used instead of available carbohydrates; a definition for glycaemic carbohydrates has been added to the report. SACN feels the term glycaemic carbohydrates helps understand the glycaemic index/load concept. Furthermore, the concept of available carbohydrate is open to misinterpretation and is not particularly helpful. The issue about the liver also depends on the time of day and how much carbohydrate is ingested. Also, the initial uptake into the liver is very high, whether it stays there and is stored is what varies, but that nuance is beyond the scope of the present report.
Page 13 2.18	Glucose energy value 15 kJ/g (3.6 kcal/g) etc. • The energy values quoted from FAO (2003) are subject to biases towards the over generalisations of the Australian food labelling system and further errors arise in inter conversions between kJ/g and kcal/g that would have been unacceptable to the UK committee originally responsible for assigning kJ values for macronutrients. As a scientific document, scientifically valid values should be used by SACN.	Accurate values have been used for the energy contents.
2.19 Glycaemic index and glycaemic load	The section is confused by unnecessary detail, lack of direction, and complicated sentences. I rewrote the paragraph to help minimise these problems, bring clarity, accuracy and direction. *'Glycaemic index (GI) and glycaemic load (GL) are two measures of the glycaemic characteristic of foods. GI is a relative measure of the capillary*	SACN thanked the respond for redrafting this paragraph which has been included in the report with a number of amendments and the following sentences added at the end *"A benefit of lower GI and GL might be anticipated where a risk/benefit is mediated by post-prandial*

Reference	Comment	Action agreed by SACN
	blood glucose response to a specific ingredient, food or portion of a meal, as compared with the response to a reference food having the same amount of available carbohydrate (usually 50g). The reference food can be either pure glucose or another, alternative, carbohydrate food (e.g. white bread). When alternative foods are used as reference they are calibrated against glucose (Brouns et al., 2005). A foods GL is the product of GI and its available carbohydrate content (Brouns et al., 2005), so taking into account both the quality of the carbohydrate food and the amount of available carbohydrate it contains. GI (thus also GL) is influenced mostly by the types and structures of carbohydrates present in foods and to lesser extents by the types and amounts of protein, fat and non-starch polysaccharide present. External influences on a foods GI include, milling, cooking, cooling and storage conditions (Brouns et al., 2005; Venn & Green, 2007). Variation in GI among foods reflect ~~mostly~~ the variation in rates of carbohydrate digestion and absorption, ~~and to lesser extents~~ variation in the rate of glucose production ~~other than from the digestive tract (e.g from liver)~~ and disposal from the circulation into the tissues (Schenk et al., 2003; Eelderink et al., 2012a; Eelderink et al., 2012b). ~~The critical relations for GI and GL are the associated risks or benefits, and whether GI and GL values have greater predictive value for health than available carbohydrate alone, which is expected mechanistically where the risk/benefit reflects a carbohydrates foods influence on glycaemia, and excessive glycaemia has (or associates with) adverse effect on health.'~~	*glycaemia. The majority of the literature on GI and GL, however, does not allow for certainty that the carbohydrate content of an exposure is the sole influence on the GI or GL of a diet, nor that a similar GI or GL for different foods has the same physiological basis. This limits the confidence in assigning cause-effect relationships for outcomes based on variation in diet GI or GL."*
Page 14 2.26 Table 4	Definitions for Sugars] • To emphasize comment at 18.1. None of the sugars definitions provided by the UK, USA, WHO and EU include polyols. • In Canada 'wholegrain' does not include the germ, thus making an important difference both nutritionally and by comparison with definitions from most if not all other counties mentioned in the SACN	SACN did not intend polyols to be regarded as 'sugars' the report has been amended to ensure that this is not implied in the final version. The issue over the definition for whole grains varying between countries is well illustrated by the examples given. This reinforces SACN's concerns about the

Reference	Comment	Action agreed by SACN
	report.	difficulty in drawing quantitative conclusions from the present literature.
Page 14 Chapter 3. Dietary sources and intakes of carbohydrates 3.7	Mean intakes of total carbohydrate in the UK in adults and children aged 4 years and over were 200-240 grams/ day. • At 200g/d total available carbohydrate, person consuming diets of GI>50 are at increased risk of Type-2-diabetes owing to the amount of the available carbohydrate, total. and higher GI of carbohydrate foods eaten (Livesey et al, 2013 [3, 4]), a comprehensive systematic meta-analysis of all the then published prospective cohort studies.	The section is simply describing sources and intake, without reference to the SACN or other risk assessments.
Page 14 3.11	"Mean total sugar" "glucose and fructose" • Please be specific from the beginning of the paragraph. Does this mean total Sugars: or total sucrose, or total non-milk extrinsic sugars or something else? • Would this be free glucose and free fructose, or totals from all sugars?	The term "total sugars" refers to total sugars. In this instance "glucose and fructose" means free glucose and fructose. The following amendment has been made to paragraph 3.11 *'Mean intakes of glucose and fructose (exclusive of that delivered as sucrose) were 15-18 g/day each …'*
Page 14/15 3.22	• If there is no data or data are irrelevant for adults please state the case, otherwise readers may consider the report to be incomplete. Non-starch polysaccharides intakes and dietary sources • It is impossible for consumers to compare data on the food label (as Total dietary fibre – as required in food regulations) with NSP in this report. There should be a separate heading for Total dietary fibre. If such information has not been collected then the reason for not collecting the information should be given and a recommendation to have this information collected be made. Whatever the food politics in the UK,	The report has been amended, and now states where there are no data or the data are irrelevant for adults. The recommendations for dietary fibre have been changed to be in line with the food label values so this won't occur in the future. This is explained in the report.

Reference	Comment	Action agreed by SACN
	absence of information is unhelpful to consumers funding this study.	
Page 15 Chapter 4. Background on health outcomes 4.3	• The first sentence of this paragraph is too long and complex leading to ambiguity. Readers might be left wondering 'Does tobacco use result in obesity?'	The order of the contributing factors has been changed to *'…by cardiovascular risk factors: poor diet and physical activity (which together increase the risk of obesity), tobacco use…'*
Page 15 4.4	"obesity associated with type 2 diabetes • For the sake of helping the consumer and the journalist writing for them, please reword to make evident also that type 2 diabetes can occur in non-obese individuals, not meaning only those who are overweight but also those with little body fat. Ditto other metabolic diseases.	The following sentence has been added to the end of paragraph 4.4, *"Type 2 diabetes and other metabolic diseases can also occur in non-obese individuals."*

Reference	Comment	Action agreed by SACN
Page 15 5.6	"Nearly all trials are conducted in overweight or obese individuals and the diets involve energy restriction goals and most trials result in weight loss." • It is difficult to know at this stage of reading (or for persons dipping in and out) whether the parameters presented to describe the cohort and trial studies and questions asked are those selected by prior design of the review group or those that were variably identified in the original reports. There is little evidence that the review group tested hypotheses that might have been raised in the literature as possible explanations of heterogeneity. • The clinical significance of a find can be the same whether the outcome or association arises directly or indirectly via body weight change. Only the mechanism of action differs; this providing that the studies have been analysed and interpreted appropriately. If the mechanism is shown to involved a difference between treatments in change in body weight, then the risks/benefits investigated potentially then also have a plausible mechanism—others not investigate might be predictable, too.	SACN thanked the respondent for their comments. However, this section is simply describing one of the issues that arises from the empirical evidence base that complicates interpretation of the data.
Page 16 5.7	"consideration has been given to" • What does this mean – an opinion was expressed or data were analysed to address the question? In some ways the review is telling us of the problem and not how the review group overcame it	This refers to the interpretation of results when carbohydrate (and thus reciprocally fat) contents were changed. Where relevant it is stated in the analysis of the results that the changes observed may be due to changes in fat rather than carbohydrate
Page 16 5.8	"2012" • Search needs updating.	The literature search was updated for certain outcomes up to 2012. In addition, members were able to bring subsequent relevant papers to the Group's attention and the consultation process presented an opportunity for other recent and older papers to be considered. SACN

Reference	Comment	Action agreed by SACN
		considers that it is neither realistic, nor necessary, to have an open ended continuous acquisition phase to a review of the evidence.
Page 16 5.9	"No significant association" • We are not informed with sufficient information, such as duration of intervention or follow-up, range of carbohydrate intake and difference in treatments, whether normal overweight, obese or mixed body weight groups, whether in male, female or mixed-sex population samples etc. • At this stage of reading it is unclear whether cohort and intervention studies were combined in one meta-analysis (unwise) or examined separately. This uncertainty is present throughout the report and could have been avoided by an appropriately wise statement in the methods section.	The methods section clearly states that *associations* were studied for the prospective cohort studies and *effects* in the RCTs. When the results are presented they are separated into the cohort studies and the RCTs. In many cases there were no RCTs and so only cohort studies are described. The detail of the studies can be found in the underlying systematic reviews or update searches. It is not appropriate to include this degree of detail in the overarching report as it would be unnecessary repetition and make the report even larger than it is presently.
Page 16 5.10	"Three studies could not be included in the meta-analysis" • Reason is lacking and should be stated.	This information is provided in the systematic review.
Page 16 5.1	"higher, lower" • There is no point of reference with respect to the average diet in UK adults or relative to guidelines. This makes the context difficult to appreciate and application of the conclusions impossible. Overall the conclusions are doubtfully agreeable but quantitation is problematic for a variety of reasons mentioned elsewhere herein. In some groups of people a measure may rise in others fall, overall average effects for the combined groups tending to the null while in reality there may be significant effects.	The studies included had a wide range of diet compositions and it is unrealistic to attempt to standardise them or compare them with UK intakes or guidelines. The meta-analyses, where they can be performed, do include analyses relative to UK intakes and SD of intakes. The issue over GI and GL is not possible for the vast majority of the literature included because the information is not provided. Subsequent analyses do look into GI and GL from the few studies where the information is available.

Reference	Comment	Action agreed by SACN
	• The data are concerned with studies reporting total carbohydrate. It should be mention early on that no consideration is given to carbohydrate quality among the data extracted for review. Thus carbohydras of high GI and Low GI may differ, as shown in some published studies. • It is not clear in the draft report whether the conclusions reached apply to the UK population or whether population and ethnicity are important factors.	
Page 16/17 5.35	"Adequate evidence …A diet higher in carbohydrate and lower in fat may decrease fasting total cholesterol concentration, but it is not possible to exclude confounding". • If it is not possible to exclude confounding, how can the evidence be adequate? Explicit qualification of these contrasting notions would be helpful.	It is SACN's judgement that the evidence is adequate but the caveat needs to be stated because the evidence available does not permit the mechanism to be attributed to the change in carbohydrate rather than the change in fat.
Page 17 Post 5.43	"Higher carbohydrate, average protein diets and fasting total cholesterol concentration. • If the mechanism of effect is via weight reduction, is it appropriate to call this confounding? • If it is not possible to exclude weight loss, this may be because there is too little data or the meta-analyst has not analysed weight loss as a contributor/confounder. Please be informative.	It is SACN's judgement that the text clearly summarises the results and also the possibility that variations in weight loss may contribute to the differences observed. Any further speculation about mechanisms needs further research.
Page 17 Post 5.49	"Higher carbohydrate, average protein diets and fasting triacyleglycerol concentration. • If the mechanism of effect is via weight reduction, is it appropriate to call this confounding? • If it is not possible to exclude weight loss, this may be because there is too little data or the meta-analyst	It is SACN's judgement that the text clearly summarises the results and also the possibility that variations in weight loss may contribute to the differences observed. Any further speculation about mechanisms needs further research.

Reference	Comment	Action agreed by SACN
Page 17 Post 5.54	And other boxed conclusions. “The effect is biologically relevant” • Does this mean the effect size is biologically relevant or the direction of the effect is in the right direction to be beneficial? This is not easily established from within the draft report.	The judgement relating to ‘biological relevance’ is both in terms of magnitude and direction and is not always ‘beneficial’.
Page 17 Post 5.56	“Higher carbohydrate, lower fat, average protein diets and fasting LDL-cholesterol concentration.” • If for carbohydrate one is not being concerned about carbohydrate quality, why then is one concerned about the type of fat as a potential confounder? Might the conclusion be indicative of biased in the report?	The comment about type of fat is a consequence of the well-established differences between saturated, mono- and polyunsaturated fats and disease risk. There was and is no bias in relation to types of carbohydrates, the evidence has been considered regarding the different carbohydrates and conclusions drawn.
Page 17 Post 5.59	“Higher carbohydrate, lower fat, average protein diets and fasting triglacylglycerol concentration.” Box. • Given the nature of the intervention, is it appropriate to claim possible confounding by fat. Rather than apply a negative view to these studies, why not state it as it is (as seems): ‘The effect may be due either to more carbohydrate or less fat or to both; to date, potentially confounding variables have not been explored’.	The respondent’s alternative description of the way in which observed effects/associations may be due to carbohydrate or fat is valid, but it is not substantially different to the view expressed by SACN.
Page 17 Pre 5.64 to pre 5.68	heading “Higher carbohydrate diets and …” • The headings are insufficiently informative, ditto the box conclusions. • As in other places there is an issue in some of these boxes: Carbohydrate quality is not considered while fat quality is considered.	The issue of carbohydrate quality has already been addressed and the information is not actually available in the bulk of the publications considered. The titles and conclusions in the boxes are clear and there is no obvious need to change them.
Page 18	“blood glucose level”.	It clearly states that one of the studies reported fasting blood glucose, it and the others either had actual blood

Reference	Comment	Action agreed by SACN
5.84	• Please be specific, fasting or random sample etc.	glucose or AUC after a glucose load. Again the details can be found in the systematic review.
Page 18 5.95, 5.97, 5.98	"Due to different methodologies…not possible to conduct a meta-analysis." • If no meta-analysis is possible, how can evidence be considered "adequate", surely it would be limited? Explain what the common finding is. This applies throughout the draft report.	The respondent challenges the conclusion that there is adequate evidence of no effect in the absence of a meta-analysis. The text clearly describes the observations in the large number of publications reviewed and also makes it clear that a meta-analysis is not possible due to the variations in insulin assays. It would be incorrect to conclude that this was only limited evidence.
Page 18 5.114	"stratified" • Is "stratified" meant to inform that subgroup analysis was undertaken or was something else done. Please be specific.	As stated, stratified refers to trials that were grouped into those which adjusted fat, protein or adjusted fat and protein.
Page 18 5.121	"Due to high heterogeneity between trials (I2=80%), it is not possible to report the meta-analysis pooled estimate." • Of course it is possible, and desirable to do so alongside a scientific valid reasoning of the caveat.	Thank you for identifying this error. We acknowledge it is possible but we stated at the start that we would not perform meta-analyses and calculate effect sizes when I^2 exceeded 75%. The text has been reworded.
Page 18 5.122	Heading "Higher carbohydrate ….average…higher,, lower… average compared with lower…higher…lower average and higher" • The headings is far too complex. The last half of the first sentence might be used instead. • No effect? What about the heterogeneity of study treatments?	The respondent raises valid concerns but also does not seem to have fully read the text. We acknowledge a p value of 0.06 is of borderline significance, but also point out this finding has not been considered further because the change in fat mass that it relates to is in the opposite

Reference	Comment	Action agreed by SACN
	• Can a probability of 94% be considered 'No effect'? In reality it is misleading to claim 'No effect' on limited evidence, rather 'inconclusive would be appropriate. This is a problem encountered throughout the report. • There appears to be considerable reuse of data in different meta-analyses. Doing so risks a chance significant result. This makes it difficult to accept conclusions of "Effect" as a real effect. How was this overcome?	direction to the change in body weight addressed in the previous paragraphs. The various studies reported data on BMI, weight, body composition so of course there are multiple assessments of potential dietary effects. But it is not a re-use of the same data and, thus does not merit a strategy to 'overcome' it.
Page 18 5.134	• It would be appreciated if some information about restrictions on eating were presented. If all studies allowed ad libitum energy intakes it would help to say so.	The specific details of the studies are provided in the relevant systematic reviews.
Page 18/19 5.138	"No significant association [for carbohydrate intake on colorectal cancer]" • It is possible that low dose of carbohydrate (in association with fat) promotes colorectal cancer and high dose is protective (in association with fibre) or even vice versa if carbohydrate directly promoted higher insulin-like activities). Combining all doses, a conclusion of 'No effect' might then arise under the current system of data synthesis and would be misleading. • Only by considering the cohort studies and the intervention studies together might a No effect conclusion arise, yet there are two conclusions, one of which is premature, and the other of which is only apparently substantiated. Adequate evidence?	The analysis of the cohort studies looked at the range of carbohydrate intakes so if the scenario proposed in the comment had happened, it would have shown a significant reduction in relative risk. There were no RCTs which qualified for inclusion, so the other comment is not relevant for the data considered.
Page 19 Tables 5.1-5.3	[absent information] • It would be useful to have tables of findings with adequate evidence and possible evidence. If not at this point in the Report, a reference at this point about where such tables can be found.	It was decided not to include such tables as the text associated with the various analyses and results is critical and needs to be looked at when the results are presented. A table could easily lead to inappropriate conclusions

Reference	Comment	Action agreed by SACN
		being drawn.
Page 19 Summary and conclusions *5.151	"There is a lack of evidence on total carbohydrate intake in relation to oral health" • Readers dipping into the report would be confused by this viewpoint. We know that caries is the result of acidogenic carbohydrate fermentation, including oral fermentation of starch in addition to sugars. Some qualification is needed if the summary statement is not to be abused.	The conclusion is correct and if people choose to 'dip in' without reading the explanations /rationales then they should realise that there is a risk they will misinterpret the evidence and conclusions. The evidence reviewed did not demonstrate adverse outcomes with fermentation of starch in the mouth, and the evidence is clear that there is no association of dental problems with total carbohydrates intake.
Page 19 *5.152	"No association is indicated between total carbohydrate intake and …glycaemia…" • We know that there is a blood glucose response to carbohydrates. Some qualification is needed if the summary statement is not to be abused.	SACN thanked the respondent for their comments. The text of the report has been amended.
Page 19 5.153	"Total carbohydrate is the sum of the sugars, starches and dietary fibre" • It is unclear whether this definition is in keeping with the definition in all the papers reviewed or even in keeping with the intended definition for the purposes of this Report. • If this definition is intended, a statement is needed making explicitly clear that studied reporting available carbohydrate rather than total carbohydrate have been excluded. This needs to be made both at the outset of the Chapter 5 and again in the summary. • A reference within the Report to the intended definition for the purposes of the review is needed. • If this definition is intended, the whole of chapter 5 is irrelevant to consumers in the UK which defines carbohydrates, total, differently.	The statement is clear and simply indicates what is meant by total carbohydrate in this report. To refine this further by talking about GL, available carbohydrate or different types of fibre is inappropriate in relation to the point being made – which is simply that total carbohydrate is a term that could represent different combinations and in many cases there is no indication of the component parts.

Reference	Comment	Action agreed by SACN
Page 20 5.154	"Randomised controlled trials assess the effect of varying total carbohydrate intake, by reciprocally varying fat, type and quantity, and/or protein intake". • Is this statement really true. Reduced energy diets can be created by reducing intakes of any macronutrient without reciprocation.	Yes it is correct in the context of the report. Total carbohydrate is considered both as grams per day and % of energy. While a reduced energy diet could change carbohydrate amount without changing one or other of the other macronutrients, in terms of % energy there would be an increase in the other components if carbohydrate is reduced. The other comments about the meta-analyses are interesting points but of little direct relevance to the issues being considered. This report is not about one component of carbohydrate in the diet (eg GL) but about all components identified at the start. Thus it is complex and contains a lot of information. The fact that the same studies can be used to assess different aspects of dietary carbohydrates is certainly an indication that nutrition is complex. SACN was fully aware of this and expressed caveats for the conclusions and the possibility of confounding where it was relevant.
Page 20 *5.154	"These trials indicate no significant effect of varying total carbohydrate intake on vascular function, inflammatory markers and risk factors for type 2 diabetes mellitus." • The report carries too little information to know whether or not any of the Reports conclusion for Chapter 5 are valid. • Among the many meta-analyses, and reuse of data across meta-analyses, there has to be concern about the validity of p-values for combined outcomes. • Because numerous questions have been asked, there has been a lack of essential focus on any one question.	SACN thanked the respondent for their comment. However, SACN stands by the conclusion, which reflects the empirical evidence judged according to *a priori* criteria. Many of the issues raised by respondent have been explicitly noted in the report and considered by SACN in deliberations.

Reference	Comment	Action agreed by SACN
	• The Report states only that meta-analyses have been undertaken. However, nutrition is complex and studies are not fully controllable within and among them for equality, which makes meta-analysis without covariates a tool that lacks power to address questions of importance. • The report does not recognise the potential for an exchange of adverse effects of carbohydrate for adverse effects of fat which can obscure the knowledge that needs to be acquired, and leaves the reader with the impression that both are safe at any level. • There is no distinction between 'confounding' and 'mechanism of action' in studies where body weight complicates interpretation of the observations made. This is all the more important if the caveat raised in this paragraph is true "applies to all cardio-metabolic risk factors investigated".	
Page 20 5.155	"The trials do provide evidence " • A reference to the para in the Report supporting the conclusion would be helpful to readers (i.e. stating para 5.??).	This is a conclusion and the previous text should be looked at to identify the basis of it. It is not appropriate to point to every results paragraph in these summaries and conclusions.
Page 20 5.156	"Overall, prospective cohort studies indicate that total carbohydrate is neither detrimental nor beneficial to cardio-metabolic health." and "risk of colo-rectal cancer. " • The report does not recognise the potential for an exchange of adverse effects of carbohydrate for adverse effects of fat which can obscure the knowledge that needs to be acquired, and leaves the reader with the impression that both are safe at any level.	Such theoretical possibilities could be levelled at many assessments of nutritional factors in relation to health. This is a carbohydrates report and that is the focus. Where possible effects or associations could be explained by alteration in fat or protein, the report draws the reader's attention to this possibility. If fat and carbohydrate have equally detrimental effects, there would still be no additional risk associated with swapping one for the other.
Page 21 6.6	"update search" • Date of update not stated. It is nevertheless out of date.	The update search dates are stated in the methodology section of the report.

Reference	Comment	Action agreed by SACN
Page 21 6.7	No association [for sugars and coronary events]. • This is consistent with the metabolic effects from intervention studies. • It is hard to know what dose range the conclusion applies.	Details of the dose range are provided in the cardiometabolic health systematic review.
Page 21 6.9	"No effect [for sugars and blood pressure]" • It is hard to know what dose range the conclusion applies to. • It is hard to know over what duration the no effect applies to.	Details of the dose range are provided in the cardiometabolic health systematic review.
Page 21 6.11	"No effect [for fasting total cholesterol]" • It is hard to know what dose range the conclusion applies. • It is hard to know over what duration the no effect applies.	Details of the dose range are provided in the cardiometabolic health systematic review.
Page 21 6.13	"No effect [for fasting LDL-cholesterol]" • It is hard to know what dose range the conclusion applies. • It is hard to know over what duration the no effect applies.	Details of the dose range are provided in the cardiometabolic health systematic review.
Page 21 6.15	"No effect [for fasting HDL-cholesterol]" • It is hard to know what dose range the conclusion applies. • It is hard to know over what duration the no effect applies.	Details of the dose range are provided in the cardiometabolic health systematic review.
Page 21 6.19	Effect" and "Adequate evidence" [for energy intake]" • It is hard to know what dose range the conclusion applies. • It is hard to know over what duration the no effect applies. • Only one study investigated isoenergtic diets, it cannot be said therefor	Details of the dose range are provided in the cardiometabolic health systematic review. The studies presented demonstrate that consumption of diets high in sugars results in higher energy consumption

Reference	Comment	Action agreed by SACN
	that there is Adequate evidence” • Evidence on comparable studies with other energy sources has not been presented, it is hard therefore to particularize the conclusions to sugars. 6.21 “	possibly due, in part, from passive overconsumption and inadequate energy compensation.
Page 22 6.21	“No association” [for sugars and Type-2 diabetes] • It is hard to know what dose range the conclusion applies. • Were all sub-cohorts included in the analysis? • Were data appropriately transformed prior to analysis? • It is questionable whether all studies excluded provided insufficient evidence for inclusion in a meta-analysis. It is customary to consult with the original authors to acquire the required information.	Details of the dose range and the cohorts included in the analysis are provided in the cardiometabolic health systematic review. A standard protocol for handling data was used for the analyses. SACN agrees that it is good practice to contact authors of existing publications to request necessary information not included in publications, and to establish if any results exist for outcomes or exposures not included in the publication. For a one-off meta-analysis this would have been done to maximise the amount of evidence for review and to minimise potential for publication bias. However, on the scale of this report, including many hundreds of combinations of health outcomes and carbohydrate-related exposures, leading to nearly 200 individual meta-analyses, covering a very wide range of dietary exposures and clinical outcomes, this was not feasible. Much of the observational data reviewed was of a historical nature and would not be easily accessible – almost certainly less so than RCT data where there is greater requirement for access to data. Furthermore, there was a tight deadline to produce these analyses. For pragmatic reasons, the review team restricted themselves to published data.

Reference	Comment	Action agreed by SACN
Page 22 6.23	"Sugars and blood glucose concentration" "No effect" • This would be a surprising conclusion. Perhaps "fasting blood glucose concentration" would not be surprising.	SACN thanked the respondent for their comments, the text of the report has been amended.
Page 22 6.25	"Sugars and blood insulin concentration " No effect" • It is hard to know what dose range the conclusion applies. • It is hard to know over what duration the no effect applies. • The conclusion is surprising, perhaps fating insulin concentration is meant.	SACN thanked the respondent for their comments; details of the dose range are provided in the cardio metabolic health systematic review. Blood insulin concentration is the correct outcome as not all the included trials report on fasting insulin concentration.
Page 22 6.26	'Studies excluded' • Please check the references are correct: Janket et al 2003 was excluded from an earlier meta-analysis, but not here?	Janket et al. 2003 provides information on sucrose intakes and, therefore, could be included in a meta-analysis in this instance. However, the article did not provide intake data for glucose, fructose or lactose which prevented it from being included in further analyses.
Page 22 6.27	"cases and controls" • Clarification is need, case-control studies were said to be excluded? • Perhaps cases and non-cases is meant? (Or is non-referent and referent cohorts meant)?	Monterrosa et al., 1995 examined whether baseline lifestyle factors predictive of 8-year NIDDM incidence differ in Mexican-American men and women. The respondent is correct that the information is referring to cases and non-cases, the text has been amended.
Page 22 6.29	'Fructose, glucose, sucrose' • It is unclear whether studies have been unduly excluded from the meta-analysis. It would be unusual for a food composition database to present sucrose as though fructose and glucose. It is incumbent on meta-analysts to correspond with original study author for clarifications of this type of issue. Failure to do so risks bias.	SACN agrees that it is good practice to contact authors of existing publications to request necessary information not included in publications, and to establish if any results exist for outcomes or exposures not included in the publication. For a one-off meta-analysis this would have been done to maximise the amount of evidence for review and to

Reference	Comment	Action agreed by SACN
	• Was all available data meta-analysed such as in dose-response meta-analysis? • Was heterogeneity due to results from a single study?	minimise potential for publication bias. However, on the scale of this report, including many hundreds of combinations of health outcomes and carbohydrate-related exposures, leading to nearly 200 individual meta-analyses, covering a very wide range of dietary exposures and clinical outcomes, this was not feasible. Much of the observational data reviewed was of a historical nature and would not be easily accessible – almost certainly less so than RCT data where there is greater requirement for access to data.
Page 22/23 6.30	'Janket et al excluded from meta-analysis for insufficient data' • It is unclear whether the data applies to fructose from crystalline fructose or from high-fructose corn syrup, or from fruit eaten whole or juiced or is any source of free fructose. • It is unclear what data is missing. • Potentially inclusion/exclusion criteria adopted may not be appropriate or an inaccurate view of the published study has been taken?	The author's definition of the source of fructose varied and the data presented in the paper was taken as presented with the caveat the sources may have differed between papers. The reason for Janket et al. 2003 being excluded from the meta-analysis is provided in the cardiometabolic health review.
Page 23 6.34	"Sugars-sweetened beverages" and "Association". • It is unclear whether the association applies to data from carbonated sugar-sweetened beverages. • No information is presented to compare with intensely sweetened carbonated beverages (lacking sugar), which also shows effect. • Whether or not there is reality among the potential for confounding has not therefore been excluded in the presented analysis.	The term sugars sweetened beverages was defined by the authors of the individual papers. The definition used across the various papers varied and there was insufficient evidence to determine the effects/associations of individual types of sugars sweetened beverages.
Page 23	"maltitol" and "isomalt"	SACN thanked the respondent for this comment.

Reference	Comment	Action agreed by SACN
*6.38 (1st point)	• Evidence is claimed for the polyol maltitol. However, the study of Sinaud et 2002 did not study maltitol, it studied a mixture of hydrogenated malto-oligosaccharides and hydrogenated malto-polysaccharides.	Sinaud et 2002 used a maltitol syrup, called Lycasin HBC. The product website states it is 50-55% maltitol, see http://www.roquette-food.com/lycasin-maltitol-syrup-sugar-substitute-confectionery-cookies-pastry/# They did also use hydrogenated polysaccharide fraction (HPF) of Lycasin HBC, but the colo-rectal review only used data from the polyol group. Sinaud et al 2002 therefore use a polyol as stated in the report.
Page 23 *6.38 (2nd point)	"One trial reports no significant effect of the sugar alcohol isomalt on faecal weight" • The t-test was two sided for the study on isomalt. However an elevation in faecal weight was expected. • Other studies report very high consumptions 50 to 100g/d, whereas isomalt was studied at realistic dose of 30g/d. Elevating the dose would elevate wet weight significantly. High wet weights are achieved due to the osmotic properties of polyols.	The point being made is that the effect of isomalt was probably statistically significant, contrary to the conclusion of the paper. The comment is intended to emphasize that high doses of isomalt would exert a greater laxative effect. Given the small number of studies available and the low levels of sugar alcohols in the diet, this point is of doubtful significance in the context of the report.
Page 23 *6.38 (3rd point)	"The direction of the effect demonstrates that greater consumption of sugar alcohols is of minor benefit to health because of the limited presence of sugar alcohols in the diet" • The conclusion makes no sense because it states in other words "direction of effects predict benefits are minor'. Surely it's the size and direction of effect that predict minor health benefits among habitual consumers. • On the basis of this idea, polyols have potential benefit over sugars in respect of stool wet weight and constipation (and the putative relation	SACN agrees that the wording is confusing and has amended it.

Reference	Comment	Action agreed by SACN
	between faecal wet weight and colorectal cancer). • Polyols have benefit in respect of laxation.	
Page 23/24 *6.51	"No association [between sugars sweetened beverages and BMI]" • The conclusion needs qualification for the following reasons: • There is little doubt from intervention studies in adults that sugar-sweetened beverages contribute energy and can elevate BMI. The extent of the effect after consideration of energy compensatory mechanisms is small (2-3kg of body weight and gain appears limited in duration 1-2 year). It is unclear whether other, non-sugar, energy sources taken in drinks have the same effect—maltodextrin for example or whether this effect is limited to energy in beverages and not solids (foods). To date the evidence on these questions has not been adequately reviewed. • The review is incomplete in not identifying prior meta-analyses. • The review is incomplete in not spotting all relevant studies (Shulze et al 2006 [8]for example who point out the temporal response to change in ssb intake).	The conclusion indicates conflicting evidence and the conclusion is therefore defined as limited evidence.
Page 24 *6.53	"No association [with body fatness]" • No association and no significant association are not the same. • It is hard to believe that 5 cohort studies provided insufficiently comparable data for meta-analysis to be performed. • Further information and appropriate qualification is essential to improve on crediblity.	SACN thanked the respondent for their comments, the text of the report has been amended.
Page 24	"experimental group" and "intervention group"	SACN thanked the respondent for their comments and refers the reader to the original publications for further

Reference	Comment	Action agreed by SACN
*6.56	• There is a distinct lack of clarity. • The experimental group is undefined. • The intervention group is also undefined. • The reader does not wish to stop to puzzle over what is meant and be left hanging in uncertainty.	details.
Page 24 *6.57	"lower BMI z-score" • Overall there is little contextual information. • Significantly lower (P-value)? • Lower to a biologically relevant extent? • Sufficient to not have to worry about other energy sources and physical activity? • "good retention", what is good to the layperson, and does any scientist outside the review process know what the Report author considers as "good"?	SACN thanked the respondent for their comments and refers the reader to the original publications for further details.
Page 24 *6.58	"insufficient voluntary reduction in other energy sources" • There is little contextual information. • How big a difference in body weight throughout the study? • How long was the study? • Was weight gain progressive or at a new steady state by the end of the study? • Considering the weight gain achieved, was the effect size sufficient to explain the 'epidemic. of obesity? • Does the boxed conclusion apply at all levels of sugar sweetened	SACN thanked the respondent for their comments and refers the reader to the original publications for further details.

Reference	Comment	Action agreed by SACN
	beverage intakes? • Is there an effect of beverage energy or sugars in the beverage?	
Page 25 *6.59	"Five cohort studies" • This was four cohort studies, one of which appeared in two publications. • If four studies, please report 4 not 5 studies. • Is there a similar problem throughout the Report with reporting study numbers?	SACN thanked the respondent for pointing this out. The text has been amended.
Page 25 6.62	"frequency of bedtime sugars consumption from drinks" • Did post drinks tooth brushing make a difference?	SACN noted whether studies had controlled for brushing, but there was no distinction between brushing time.
Page 25 6.65	"adjusted for tooth brushing" • What does this really mean? Was the adjustment towards the centre, towards tooth brushing or towards not brushing teeth or something else? • Were the adjustment similar for each study? • Ditto for all other section referring to adjustments. • It would be useful to know whether those who brush had no increased incidence of caries in this and similar sections. • There is no reference to fluoridation or use of fluoridated mouth washes. Are these practices insufficient to prevent the effect of sugars. It is hard to know the exposures of participants for which results are evident in this Report.	This statement refers to the experimental methodology and relates to whether or not reported tooth brushing was one of the variables that was used in adjusting the risk during multivariate analysis. Within the context of this review, the methodology of adjustment was not assessed. The purpose of controlling for tooth brushing is to eliminate this variable as a potential confounder of the sugars / caries relationship but it was not considered whether reported brushing influenced outcomes in this analysis. Most often studies did not report on water fluoridation (which is rare apart from in the US) and mouthwash use (which is equally rare on a population basis.

Reference	Comment	Action agreed by SACN
Page 25 6.66	"3.5 years and 18 months" • Harder to comprehend than needs be. • Surely '1.5 and 3.5 years'. Why the confusing mixture of units and non-chronological order?	Convention reports age in months up to 24 and then years thereafter.
Page 25/26 Prior to 6.69	See 'Annex 1 Polyols' for each page and word of the SACN draft report for which comments arise together with some proposed changes. The heading "sugar alcohols" • The term that should be used, for the sake of the consumer, is 'polyols' as in food labelling. • WHO/FAO 2003 explained why—because polyols are neither sugar nor alcohol. That is sugar alcohol is ambiguous and often misunderstood by lay persons. (See comment against 2.1).	The report has been revised accordingly.
Page 26 *6.70	"In the trials that employ a 'no gum' control group, it is unclear whether it is specifically the sugar alcohol or the act of chewing and the concomitant increase in salivary flow that contributed to the effect." • Fails to recognise that all mechanisms of effect for reduced caries here mentioned are secondary to polyols use. • Polyols are permissive of the act of chewing. Chewing tends to stop when the sweetness ceases due to the polyols eventually being released and swallowed.. • The increased level and duration of chewing brought about by the pleasantness of the polyols encourages chewing and in being pleasant encourages the flow of saliva. • Among the population exposed to sugar containing polyols, polyols further reduce exposure to sugars (the no-gum group is only one of two relevant types of behaviour in the population, no gum and sugar	The act of chewing stimulates salivary flow, whether or not polyols are involved. The purpose is to identify whether polyols themselves cause a reduction in cares rather than the physiological effect of chewing

Reference	Comment	Action agreed by SACN
	containing gum exposures), so having further effect. • Other mechanisms include polyols support of remineralisation, polyols are not a substrate for plaque formation, and negligible acidogenesis.	
Page 26 *Table 6.2	According to this table there may be sufficient evidence for polyols effect on constipation among RCTs. This would be in keeping with advice and known laxation on consuming polyols in excess of current regular low levels of polyols consumption.	Trials investigating the effect of synthetic non-absorbable sugars, e.g. lactulose, tagatose, difructose anhydride, or synthetic oligosaccharides, e.g. lactosucrose, were excluded. Of the trials included in the colo-rectal function review in subjects without colo-rectal problems only one investigates transit time. Of the constipation trials there was one where a polyol was used - lactitol – and another where it is included with other carbohydrates: lactitol, wheat bran and guar gum. Therefore, insufficient evidence.
Page 26 *6.75	A paragraph among the Summary and conclusions • Please keep a link to the evidence. • For example, state the paragraphs at which these conclusions were synthesised. • Ditto for the conclusions in other paras.	SACN has considered the respondent's comment but believe that continuous back referencing in the summary and conclusions section would result in a larger and more cumbersome document.
Page 26 *6.76	"sugars-sweetened beverages" • Please be more specific • Fruit juices? • Carbonated ssbs? • The weight on sugars is likely too great since a link with carbonated diet drinks also shows a some link to type 2 diabetes. To be fair this should be mentioned.	The term sugars sweetened beverages was defined by the authors of the individual papers. The definition used across the various papers varied and there was insufficient evidence to determine the effects/associations of individual types of sugars sweetened beverages.

Reference	Comment	Action agreed by SACN
Page 27 *6.80	Polyols and faecal bulking. • The potential use of polyols in laxation is not well represented among the analyses and narratives presented.	SACN thanked the respondent for their comment. However, SACN believes the existing text adequately captures the current evidence and its interpretation, at a level appropriate for this report.
Page 27 *6.80	Polyols and faecal bulking • Biological relevance is that polyols do not lower faecal bulk and may therefore be considered safe in regard this aspect and putative risk to health. • Some evidence indicates that certain finely divided fibres can result in constipation [9]. • Ditto there is greater constipation among the obese and elderly. • Co-ingestion of polyols as sugar replacers in cereal products would likely be advantageous. Ideally such should support the crispness of the cereal (have low hygroscopicity), be well tolerated, have low glycaemic and insulinaemic potential, produce low amounts of gas, and encourage laxation, especially among the growing population numbers of the obese and elderly at risk of constipation. • The para really ought to be more circumspect about the potential biological relevance of polyols. The number of studies reviewed is low compared with the numbers of studies available. In regard fecal bulk and colorectal cancers it remains unclear whether fecal bulk or laxation or one more than the other are of most importance. The Report's conclusion too easily accepts what is or is not important. • The biological relevance of Bifdobacteria spp remains to be 'firmly established'.	SACN thanked the respondent for their comment. However, much of this is speculation and reference to potential applications. SACN believes the existing text adequately captures the current evidence and its interpretation, at a level appropriate for this report.

Reference	Comment	Action agreed by SACN
Page 27 7.15	"Association with brown rice Intake". • Check that the data are adjusted for white rice intake otherwise this association may be due to replacement of white rice with brown rice, with brown rice being more neutral or beneficial in its association.	Yes, the data reported in Sun et al. 2010 adjusted for white rice intake.
Page 27 7.20	"No association [for potatoes and total cardiovascular disease events]" • It is unclear whether the data were adjusted for sex. • It is unclear whether the studies have sufficient quality even to draw a tentative conclusion.	The details of adjustment are provided in the cardiometabolic health review. In summary, two of the cohort studies only adjusted for age whilst the other three studies were conducted in only men or women. The studies met the *a priori* criteria for inclusion.
Page 27/28 7.23	7.23 "A full description of the studies can be found in the relevant systematic reviews." • Please cite the relevant paragraphs, SACN systematic reviews, and published or other grey systematic reviews.	SACN thanked the respondent for their comments, however considers that it is sufficient to just refer the reader to the relevant systematic review.
Page 28 7.25	"Prospective cohort studies indicate there is no association between starch intake and incidence of coronary events or type 2 diabetes mellitus." • The conclusion is difficult to reconcile with similar observations for potatoes and white rice. • It would be preferable to say "Prospective cohort studies indicate there is no association between intake starch from dietary sources (as opposed to any individual foods) in the populations studied and incidence of coronary events or type 2 diabetes mellitus." • At least this suggestion leaves open that the effect is diluted by co-ingestion of starchy foods that have a beneficial association with CHD	SACN thanked the respondent for their comments. The text has been amended to refer to 'total' starch.

Reference	Comment	Action agreed by SACN
	and type 2 diabetes (such as low GI starchy foods). • The suggestion might help to limit abuse of the Report's conclusion.	
Page 28 7.27	"Overall, the available evidence in relation to cardio-metabolic outcomes indicates no association with dietary starch when consumed in the amounts eaten in the typical UK diet." • The observations ignore the type of starch and the GI of the starchy food. • The conclusion is insecure. • Insufficient evidence is presented to know whether the overall conclusion reported are stable. • Advice is to report on stability of each conclusion (throughout the whole report).	SACN thanked the respondent for their comments. This text has been removed.
Page 28	All dietary fibres in regular diets • Dietary fibre and glycaemic index (and dietary fibre and glycaemic load) have been shown to have associations and effect that are independent, with each having approximately similar effect and association sizes [3, 10-12]. It is unclear from the draft Report that the effect and association sizes reported for dietary fibre in this chapter are not due or related to confounding by GI or GL. This independence cannot be established by simple meta-analyses (e.g. within a forest plot) or even dose-response analysis without modelling to a detail not evident in the draft Report.	These factors are correlated, and SACN considers their conclusions cautious and appropriate. More research may uncover further associations.
Page 28 8.7	8.7 "Coronary events" • Events is undefined and may be limited to one type or a mixture of several. Please define.	Coronary events refer to a mixture of different outcomes as defined in the original papers. The definitions of coronary events are provided in the cardiometabolic health review and respective original publications.

Reference	Comment	Action agreed by SACN
Page 29 8.13-8.15	8.13 to 8.15 “Body weight change” • It is unclear whether body weight or body weight change is meant. • The conclusion may not be representative of published studies.	The information refers to body weight change.
Page 29 8.17	8.17 “The majority of the studies did not make allowance for the metabolisable energy that is available in fibre due to fermentation therefore the majority of studies will have over-estimated the decrease in energy intake.” • The assertion may not be correct. • Some jurisdictions applied an energy value of 4 kcal/g to fibre, others assigned no energy value to dietary fibre. Unless this issue was examined specifically, no such comment as extracted above can be drawn.	SACN thanked the respondent for their comments. The text in the report has been amended to read “…energy that may become available from fibre due to fermentation and therefore some studies may have over-estimated the decrease in energy intake.”
Page 29 8.17	8.17 Box “No effect” • The conclusion is not secure. • The mean fall in energy intake as reported is sufficiently large to affect WHO/FAO estimates of poverty when made on an energy intake basis. • There is no analysis of bias or of stability of the outcome. • The CI range is large and there is no mention of sensitivity analysis. • The quality of studies is not described.	The conclusion is based on SACN’s agreed process for evaluating the evidence.
Page 29	8.19 “ no significant association between dietary fibre intake and the incidence of type 2 diabetes (Sakurai et al., 2012).” and “indicates”	SACN thanked the respondent for their comments. The text in the report has been amended to read “…no statistically significant association…” (SACN having

Reference	Comment	Action agreed by SACN
8.19	• Claims of no-significant association are meaningless—it all depends on the size of effect and on the precision of the study. • Statisticians often say there is too much emphasis on statistical significance and not enough on effect/association size.	agreed to apply the conventional value of P <0.05).
Page 29 8.21	8.21 “No effect” • There are too few studies analysed to draw a conclusion. • The direction of effect may depend on the metabolic state of the individual, it may be raised when values are low and lowered when too high —independently of regression the mean, as noted in Livesey et al [10] for glucose levels stretching from healthy people to diabetic patients.	The conclusion is based on SACN’s agreed process for evaluating the evidence.
Page 29 8.24	“Five randomised controlled trials” • It is surprising how few studies exists that report wet weight as opposed to dry weight or fat content or energy content. • There is a chance that not all studies have been captured.	SACN thanked the respondent for their comments. Any studies that have not been captured fell outside SACN’s inclusion criteria.
Page 30 8.27	“A pooling project” • Please define “pooling” because authors use “pooling” to mean different things, and it is often used unwisely. • Some consider it means pooling of data at the level of participation of individual persons (correct). • Some consider it means ‘pooling’ [sic] aggregate data from individual	The term “pooling project” is used because that was the terminology employed by Park et al to describe their work. For EPIC the validation studies and methods are all published.

Reference	Comment	Action agreed by SACN
	studies (incorrect, this is combining). • EPIC authors are poor at reporting the validity of FFQs used in each of the contributing clinics/laboratories, which makes it hard to know whether combining they do should be proportionate to study precision in each lab/clinic, or even whether the study quality is adequate in each contributing lab/clinic, and whether combining of many small studies can ever be as good as combining fewer large studies. All of this leads to difficulty for confidently finding real associations whatever the explanation of association.	
Page 30 8.33	Clarity. • The paragraph is unclear. • Better to say how many studies were found and the dates spanning the search. • Why does the reader need to keep being informed an update search was performed—especially that the update search is now out of date? • Please give information that provides context to the studies and not unnecessary detail. • This problem (immediately above) applies to each and every question the report asks • The para tells us of two studies and a further meta-analysis. This is awkward because a meta-analysis cannot be conducted with just two studies. The text is therefore unclear. • There is no information about the number of studies in the meta-analysis finally used. • There is no warning about potential confounding as in other conclusions, suggesting potential for reporting bias.	SACN thanked the respondent for their comments. The text has been amended.

Reference	Comment	Action agreed by SACN
	• It is unclear what is mean by insoluble fibre—whether it is restricted to that from foods or some from enriched fractions or some from isolated insoluble fibres.	Insoluble fibre is not restricted by source (food or enriched/extracted/isolated fractions).
Page 30 8.35	"The results from the later meta-analysis were used" • Which meta-analysis? Three meta-analyses are mentioned from which we get "later" rather than latest or last. • "results" but only one result is presented. • It is unclear how many studies are represented in the meta-analysis used.	SACN thanked the respondent for their comments. The text has been amended.
Page 31 8.39	As for para 8.35.	SACN thanked the respondent for their comments. The text has been amended.
Page 31 8.40	8.40 "No association [Soluble fibre and Coronary events]" • Stability of no association has not been established. • There is insufficient evidence to claim no association. A category of insufficient evidence ought to be used. • It is unclear what attempts were made to assess potential sources of heterogeneity (which is still possible for I2=0 because I2 is still an imprecise and inaccurate estimate). • The source type (food, enriched fraction, isolate) is not identified. • It is unclear what type of meta-analysis was undertaken. • It is unclear whether potential for a significant association is hidden by a small range of soluble fibre consumption.	SACN thanked the respondent for their comments. The text has been amended. The evidence met SACN *a priori* criteria for the given conclusion of 'no association / limited evidence'. Para 8.39 above indicates the meta-analysis is from Threapleton et al. (2013d), and readers can refer to that paper and the original studies for methodological details.

Reference	Comment	Action agreed by SACN
Page 31 *8.42	"No association [Soluble fibre and Type 2 diabetes]" • Stability of no association has not been established. • There is insufficient evidence to claim no association. A category of insufficient evidence ought to be used. • It is unclear what attempts were made to assess potential sources of heterogeneity (which is still possible for I2=0 because I2 is a very imprecise and inaccua5trate estimate). • The source type (food, enriched fraction, isolate) is not identified. • It is unclear what type of meta-analysis was undertaken. • It is unclear whether potential for a significant association is hidden by a small range of soluble fibre consumption.	The respondent refers to para 8.42 and thus the result for soluble fibre and coronary events (not Type 2 diabetes). The evidence met SACN *a priori* criteria for the given conclusion of 'no association / limited evidence'. Para 8.41 above indicates the meta-analysis is from Threapleton et al. (2013d), and readers can refer to that paper and the original studies for methodological details. The text of para 8.41 has been amended.
Page 31 *8.46	"No association [Fruit fibre and Cardiovascular events]" • Stability of no association has not been established. • There is insufficient evidence to claim no association. A category of insufficient evidence ought to be used. • It is unclear what attempts were made to assess potential sources of heterogeneity (which is still possible for I2=0 because I2 is an imprecise and inaccurate estimate). • The source type (food, enriched fraction, isolate) is not identified. • It is unclear what type of meta-analysis was undertaken. • It is unclear whether potential for a significant association is hidden by a small range of fruit consumption.	SACN thanked the respondent for their comments. However, SACN stands by the conclusion, which reflects the empirical evidence judged according to *a priori* criteria. Details of the meta-analysis are in the cited paper (Threapleton et al, 2013d).
Page 32	"No association [Fruit fibre and Coronary events]"	SACN thanked the respondent for their comments. However, it is unclear what is referred to.

Reference	Comment	Action agreed by SACN
*8.48	• As *8.47	
Page 32 8.56	*8.56 “Association [for Vegetable fibre consumption and coronary events]. • Is p=0.03 non-significant? • If non-significant why is there an association when in other instances when non-significance is indicated as no association?	SACN thanked the respondent for pointing this out. The text has been amended to include the correct p value.
Page 32 *8.58	“men but not women” and “Adequate evidence” • Why was there no meta-analysis with covariate for the fraction of the sample populations that were men or women? • It is unclear whether the evidence is adequate: • The meta-analysis took no account of gender. • All studies appear to have been included without first having fully examined (I2=0 or non-significant) or explained (I2>0 or significant) • It is unclear whether an adequate account has been made to verify the FFQ in each study and whether outcomes are dependent on suitability of the FFQs. • The errors will tend the combined mean towards the null.	The sentence refers to the findings as reported from the study in the update search. It is not possible to reanalyse all studies now on the basis of gender.
Page 32 8.65	“No association [legume fibre and type-2 diabetes]” • Some qualification is probably warranted. • The three studies reported are likely problematic in respect of suitable	SACN thanked the respondent for their comments. However, SACN stands by the conclusion, which reflects the empirical evidence judged according to *a priori* criteria.

Reference	Comment	Action agreed by SACN
	validity of their FFQs. • A conclusion of insufficient evidence could be appropriate; this if inadequate evidence would be seen as too nearly offensive.	
Page 32 8.73	"No association for Legumes intake(…) and cardiovascular disease events" • Meta-analysis with covariate as gender fraction as male (or as female) should have been examined. • Sex as a source of heterogeneity can result in no significant association for the combined population, even when there is an association in both sexes, unless sex faction is examined simultaneously as an explanatory variable.	SACN thanked the respondent for their comments. However, it is not possible to reanalyse all studies now on the basis of gender.
Page 32 8.88	"No effect" and "Adequate evidence" [for Oat bran and fasting blood glucose concentration] • The conclusion may be premature. • Results on healthy persons with blood glucose <5mmol/L and >5 mmol/L should be examined separately with exclusion of regression to the mean (cf Livesey et al 2008[10]).	SACN thanked the respondent for their comments. However, SACN stands by the conclusion, which reflects the empirical evidence judged according to *a priori* criteria.
Page 33 8.94	"95%CI" • It is unclear whether the energy values of the foods were directly determined or taken from food tables. • If food tables, it is not clear what values were attributed to the energy values of fibre or products ingested. • It is also unclear what the outcome is: change in energy intake or difference in intake between groups of difference in change in energy intake between groups.	SACN thanked the respondent for their comments. However, the respondent is referred to the original studies for details. The data reveal no apparent pattern differentiating the nature of the specific oat fibre exposure. The p value quoted in relation to the effect of oat fibre and β-glucans on energy intake has been corrected to state p=0.66.

Reference	Comment	Action agreed by SACN
	• It is also unclear what study designs were used, some of which could have explained the large 95% CI values. • Oat bran is an energy dense product and like muesli is easy to overeat without appropriate knowledge (some parallel with SSBs). It is unclear what the treatments were and what messages accompanied the study. One would expect provision of such a food as oatbran to increase energy intake so confounding the role of fibre if there was no appropriate message of restraint or if the consumer was unaware of the energy density of the product. • Oat bran and B-glucan should be examined separately since one is more energy dense than the other. • Altogether, insufficient information is presented to be confident in the conclusion.	
Page 33 8.96	"[multiple products for cereal fibre excluding oat fibre and energy intake]" • The products are divers, so the singular conclusion is meaningless and potentially misleading for individual products. • Confounding by resistant starch is unclear both in respect of fibre dosage or the energy density of the products. • It is unclear what efforts were made within experimental design to tighten up on study error.	The category reflects the nature of the literature, and an attempt to capture this group as a general category. The respondent is referred to the original studies for details. A sentence has been added to the relevant text: "It should be noted that this reflects a grouping of different bran sources, and no conclusion can be drawn from this for any specific bran source."
Page 33 8.99	"An investigation into the heterogeneity demonstrated that the amount of reduction in transit times in response to wheat fibre is greater when initial intestinal transit times are longer and vice versa." • Among small studies, this could be due to regression to the mean. This reflects a problem with small studies. • No information is provided about the context of these studies.	The respondent is referred to the original studies for details.

Reference	Comment	Action agreed by SACN
Page 33 8.105	"Butyrate". • A number of studies suggest some brans elevate faecal butyrate and lower faecal pH in some circumstances. • There is clearly heterogeneity in these responses (as assessed from the narrative). • The circumstances of the beneficial responses has not been identified in the draft Report. • A "No effect" conclusion may therefore be premature, with some forms being effective and others not. • The combining of heterogeneous products is problematic.	The conclusion has been changed from moderate evidence to limited evidence.
Page 34 8.109 and 8.111	8.109 - "Effect [for Cereal fibre and constipation]" • The heterogeneity in responses suggests variable or conditional effectiveness. • The "Effect" needs qualifying to identify in who or when the cereal fibre would be effective. • Measures are needed for products with reliable effectiveness. 8.111 - "Wheat fibre and intestinal transit time in patients with constipation" • The studies showing effectiveness are those showing effect on constipation. • Some studies show no significant effect on constipation, it is unclear whether transit time is unaffected or not affected significantly in this context. • If this is correct the conclusion here is biased towards those studies in	It is not possible to suggest sub-groups of the population for whom a beneficial effect might be expected. The available data do not permit measures for products with reliable effectiveness to be determined.

Reference	Comment	Action agreed by SACN
	which there is effectiveness on constipation. • The “Effect” needs qualifying to identify in who or when the cereal fibre would be effective. • Measures are needed for products with reliable effectiveness.	
Page 34 8.113	“No Effect [for wheat fibre and colorectal adenoma] • The conclusion is evidently incorrect. • A contextual conclusion is needed. • Effective in men, moderate evidence. • No effect in women, moderate evidence. • The OR and 95% CI ought to be presented for women too. • It would be useful to explain what defines “wheat fibre” so consumers can choose for themselves.	The pooled analysis is commented on in the narrative, but overall, the three trials report no significant effect of wheat fibre supplements on recurrence of colo-rectal adenomas.
Page 34 8.115	“Association [for cereal fibre and colorectal cancer]” • Meta-analysis with a centred covariate ‘gender fraction’ would have been useful if the studies adequately span men and women; this especially given the result at 8.113.	Most trials adjust their results for gender, but one observed that the adjustments showed no effect on the results. Most trials do not report separate data for men and women, except the post-hoc pooled analysis.
Page 34 8.119	“ No effect [for Breakfast cereal and energy intake].” • Impact of breakfast cereal on energy intake is likely to depend on several factors. • Museli type cereal is energy dense and may increase energy intake as people overestimate portion size. • Bran type cereals are energy dense and may elevate energy intake as	SACN thanked the respondent for their comments. However, SACN stands by the conclusion, which reflects the empirical evidence judged according to *a priori* criteria.

Reference	Comment	Action agreed by SACN
	people overestimate portion size. • The problem may be a balance between energy density on the one hand and fibre content on the other. • No consideration appears to have been given to understand the heterogeneity observed. • Because of the possibility of contextual results, it would be premature to draw a conclusion of "No effect" • Because there are limited data to assess contexts, possibly 'Moderate evidence' is too emphatic.	
Page 35 8.125	'RR for total cereal and cardiovascular disease' • The RR and 95%CI are not presented, which is undesirable.	As noted in the text, the nature of the evidence precluded a meta-analysis
Page 35 8.127 and 8.128	'Cardiovascular disease and whole grains' • It is unclear whether the study found in the update search that reported no effect of whole grains was included in the meta-analysis that now reports an association. • All studies found should be included in the meta-analysis otherwise the reader might consider that there is reporting bias.	It is not possible to update all meta-analyses with studies identified in the update search.
Page 35 *8.129	Stroke • Please define the types of stroke and their representation among the available data.	According to the review methodology: 'Stroke' included haemorrhagic and thrombotic stroke, transient ischaemic accident (TIA). The respondent is referred to the original publications for further details.
Page 35 *8.131	Hypertension • Please define hypertension as defined in these studies and the range of blood pressures across the populations.	The respondent is referred to the original publications for these details.

Reference	Comment	Action agreed by SACN
Page 35 *8.133-8.136	Blood pressure • Please define blood pressure as defined in these studies, and the range of blood pressures across which the “No effect” applies.	The respondent is referred to the original publications for their details. The description ‘no effect’ refers to outcomes of individual studies or meta-analysis where p>0.05. (i.e., ‘no effect’ really means no *statistically significant* effect by this criterion, as used throughout the report.)
Page 35 **8.142	“Effect” and “Limited evidence” for Whole grains and energy intake. • 75% of the ‘whole grain estimate[of effect]’ is contaminated by intentions to treat with decreased fat, and increased vegetable, fruit, and grains in addition to just small amounts of whole grains. • It is surprising that a conclusion of “Effect” was reached for whole grains given such evidence; this even given the caveat. • Limited evidence does not adequately describe the evidence presented. • The Report’s conclusion provides possible evidence of reporting bias. • The multiple nutrient treatment study of Tinker et al should be removed from the meta-analysis, leaving a narrative result; narrative unless a literature search uncovers further study. • Standards of reporting differ here (8.142) from elsewhere (8.144).	SACN stands by the conclusion, which is based on the number of studies and consistency of outcomes. Meta-analysis was not possible for reasons given in the report and supplementary material.
Page 36 *8.144	“I2=82%... too high to report results” • I2 too high; this can only be helpful in reporting results if the ratio of the combined mean random ES/tau2 is small and non-significant. • Why not present data for the population of study values, ensuring that the CI is correctly calculated for the population. (This can be done in Stata, not sure of other packages.) • Heterogeneity is likely due to studies with FFQs of low validity.	It was agreed *a priori* that pooled estimates from meta-analyses with I2 > 75% would not be reported, as these quantitative estimates can be considered unreliable and potentially misleading. The original study data are readily accessible in the public domain (Aune et al, 2013).

Reference	Comment	Action agreed by SACN
Page 36 **8.146	"No effect and Adequate [for fasting blood glucose]" • Data should be considered separately for <5mmol/L and >5mmol/l as results when sufficient in number can be opposing, a result that cannot be considered as "no effect" but would be normalising. • Adequate evidence? • Data are contaminated with the study of Tinker et al (see comment against 8.142).	SACN stands by the conclusion, which is based on the number of studies and consistency of outcomes. Meta-analysis was not possible for reasons given in the report and supplementary material.
Page 36 *8.147	"Adequate evidence [for whole grain and fasting blood insulin]". • Data are contaminated with the study of Tinker et al (see comment against 8.142). • It is unclear whether outcomes are related to the treatment average fasting insulin obtained in these trials, which is a likely outcome if sufficient data were to be collected from individuals without diabetes. • The standard of evidence differs from those presented elsewhere where meta-analyses are deemed adequate.	SACN stands by the conclusion, which is based on the number of studies and consistency of outcomes. Meta-analysis was not possible for reasons given in the report and supplementary material.
Page 36 *8.148	"No effect" and "Adequate evidence [for whole grain intake and fasting blood insulin]" • Data are contaminated with the study of Tinker et al (see comment against 8.142). • Weight loss trials and unrestricted energy intake trials should be considered separately. • There are too few studies of a heterogeneous analysis/design to draw conclusions about unrestricted diets. • Data are contaminated with weight loss trials, which are important but	SACN stands by the conclusion, which is based on the number of studies and consistency of outcomes. Meta-analysis was not possible for reasons given in the report and supplementary material.

Reference	Comment	Action agreed by SACN
	inappropriate for the generation of guidelines for maintenance of health.	
Page 36 *8.150	"No effect" and "Adequate evidence [for whole grain intake and insulin sensitivity/resistance]" • Data are contaminated with the study of Tinker et al (see comment against 8.142). • Data are contaminated with weight loss trials, which are important but inappropriate for the generation of population wide guidelines for maintenance of health. • There are too few studies of a heterogeneous analysis/design to draw conclusions about unrestricted diets. • Weight loss trials and unrestricted energy intake trials should be considered separately. • The conclusions reached of No effect and Adequate evidence are therefore premature.	SACN stands by the conclusion, which is based on the number of studies and consistency of outcomes. Meta-analysis was not possible for reasons given in the report and supplementary material.
Page 37 *8.152	"No association [for whole grains and colorectal cancer]" • With just three studies it is not possible to assess sensitivity of the outcome to individual studies. • With just three studies it is not possible to assess stability of the outcome. • With just three studies and borderline association, the conclusion reached is premature.	SACN stands by the conclusion, which reflects the (limited) empirical evidence judged according to *a priori* criteria.
Page 37 *8.156	"No association [for dietary fibre and body fatness]" • With just three studies it is not possible to assess sensitivity of the outcome to individual studies. • With just three studies it is not possible to assess stability of the	SACN stands by the conclusion, which reflects the (limited) empirical evidence judged according to *a priori* criteria.

Reference	Comment	Action agreed by SACN
	outcome. • With heterogeneity in measures it is doubtful whether a common metric can be achieved. • With one of the three studies apparently not considering dietary fibre intake, it is doubtful that it should be considered aside the other two for assessment of dietary fibre. • A non-significant association is not the same as no association. • It is unclear whether adjustments were made for major factors that could affect body fat. • It is unclear whether exposures were adjusted for energy intake. • Doubts exist in the literature about whether cohort studies are able to assess impacts related to energy value of the diet, especially that energy values have variably accounted for energy in dietary fibre. • With just two/three studies and borderline association, and the plethora of uncertainties, the conclusion reached is premature.	
Page 37 Tables 8.1 to 8.3	"[for] Insufficient evidence" • Revisions are needed to include studies for which the Report has premature conclusions. • There are many intervention studies of fibre and body weight that have not been considered in this review. • It is an oversight to have excluded many studies of isolated dietary fibres. • No consideration has been given to conditions for which dietary fibre intake affects or is expected to affect energy intake and fat distribution. • Potential differences of effects for under eating and over eating are not considered.	SACN has indicated in the report where conclusions are based on limited evidence ('premature' is not a defined category). The respondent has not identified any additional studies meeting *a priori* inclusion criteria for exposures and outcomes which were not considered.

Reference	Comment	Action agreed by SACN
Page 38 8.160	"Randomised controlled trials indicate there is no effect of dietary fibre intake on cardiovascular or type 2 diabetes mellitus risk factors" • The conclusion could only apply to hypothesized risk factors • Even then the conclusion must be limited to the risk factors that have been adequately examined. • Not all conclusions of adequate evidence are correct in the present report. • Conditionality of response of risk factors has not been adequately investigated, such as impact on blood glucose <5mmol/L and >5mmol/L at rest and in the post-prandial state. • No consideration has been given to non-linear associations. • No consideration has been given to the problem of thresholds of association/effect. • There is a high risk that this conclusion may be written onto effects in type 2 diabetes patients for which there is evidence of effect of dietary fibre on risk factors.	SACN thanked the respondent for their comments. The text has been amended to read "Randomised controlled trials indicate there is no effect of dietary fibre intake on the cardiovascular or type 2 diabetes mellitus risk factors considered here." SACN stands by the conclusion, which reflects the empirical evidence judged according to *a priori* criteria including outcomes and statistical procedures. The interpretation by the patient community is a risk management issue.
Page 38 8.158 to 8.162	[….] • The results are far from definitive even for the available evidence. Deeper consideration of the data is essential. • It would be better to not report than to report potentially misleading information. A more cautious summary would be appropriate. Even where benefits are suggested, the evidence provides information on neither stability of outcomes nor applicability to population sub-groups nor information on the proportion of the population or sub-population likely to respond with a benefit.	SACN believes the narrative text and expression of varying strength of evidence sufficiently capture the uncertainties in the data.

Reference	Comment	Action agreed by SACN
Page 38 9.6	"evidence on non-digestible oligosaccharide or inulin" • Please be specific, does this mean FOS and inulin, or does it mean inulin and oligosaccharides unrelated to inulin?	The terms non-digestible oligosaccharide (NDO) or inulin are used to include mainly FOS, GOS (other NDO are also included) and inulin, as inulin can be a polysaccharide form. In the conclusion box '(fructo-oligosaccharide or inulin)' has been included after the term non-digestible oligosaccharides
Page 38 9.8	"No effect" and "Limited evidence" for "Non-digestible oligosaccharides and fasting total cholesterol, HDL-cholesterol and triacylglycerol concentration" • Information on inulin should be presented separately from that for other poly/oligosaccharides. • The information reported for inulin appears to be incomplete. • Brighenti, F et al 1999 inulin and blood lipids is missing • Brighenti, F 2007 inulin meta-analysis showing decreased triglycerides and blood lipids is missing. • Tovar et al 2012 inulin and triglycerides is missing. • Many of nine studies in Wu et al 2010 inulin-type fructans and blood lipids are missing. • It is possible some of these missing studies may have been excluded on grounds of study inclusion/exclusion criteria, possibly study duration. Nevertheless, meta-analysis with a covariate for study duration would have been useful and possibly avoid conflict with the literature were effects have been shown. • The conclusion of "No-effect" consequently appears premature. • The statement of "Limited evidence" perhaps describes only that found by the Report's authors and not that available in the literature.	The studies highlighted by the respondent do not meet the report's inclusion criterion and the paper by Wu et al., (2010) is written in Chinese. SACN has considered all the evidence which met the inclusion criterion and therefore stands by the conclusions as stated in the report.

Reference	Comment	Action agreed by SACN
	• The search and analysis needs to be updated.	
Page 39 9.11	"No-effect" and "Moderate evidence" for effects of oligosaccharides on energy intake • Based on the comments presented here (at ***9.8) it is uncertain whether all evidence available has been found. • Data on inulin should be presented separately from other oligosaccharides. • Modified dextrin is undefined. • It is unclear whether the primary purpose of these trials was to assess effects on energy intake, which if it were not, may mean the studies were not designed to address this question. • It is unclear how much heterogeneity exists for the energy values applied to oligosaccharides or whether correct values were applied for assessment of energy intake. • The observation has borderline significance, a significant effect may have arisen from a dose response met-analysis. Effects at low and high dose levels can be in opposing directions. • For reasons presented here, the conclusion of "No effect" is premature.	The studies highlighted by the respondent do not meet the report's inclusion criterion or were not written in English. SACN has considered all the evidence which met the report's inclusion criterion and no evidence was highlighted by members or consultation respondents. SACN therefore considers that all relevant studies have been identified and so stand by the conclusions as written in the report, which reflects the empirical evidence judged according to *a priori* criteria. In general, SACN has included trials where outcomes were secondary endpoints.
Page 39 9.12 - 9.14	"Fasting blood glucose" and "inulin" and "other oligosaccharides" • Only five RCTs were identified that presented evidence on fasting blood glucose. • The meta-analysis did not take account of different expectations for different levels of fasting blood glucose.	SACN's conclusion is valid based on the approach used. The meta-analyses were not adjusted for baseline variable levels and possible differences in impact. This limitation has been acknowledged in the report.

Reference	Comment	Action agreed by SACN
	• “Inulin and “other oligosaccharides” should have been analysed separately. • Many other studies indicate significant effects are expected for some oligosaccharides, although these are for non-diabetic Japanese men and women. • The conclusion of “No-effect” is premature and potentially misleading. • The conclusion of “Adequate evidence” is premature and equally potentially misleading.	
Page 39 9.15 - 9.17	“No effect” and “Moderate evidence” for fasting blood insulin. • Given the extent to which the prior analyses of inulin do not represent the available literature, it has to be considered that effects on fasting blood insulin might be too. • The conclusions of “No effect” and “moderate evidence” needs re-examination.	The studies highlighted earlier by the respondent do not meet the reports inclusion criterion or were not written in English. SACN has considered all the evidence which met the reports inclusion criterion and no evidence was highlighted by members or consultation respondents. SACN therefore considers that all relevant studies have been identified and so stand by the conclusions as written in the report.
Page 39 9.18 - 9.23	Non-digestible oligosaccharides and faecal weight. • All non-digestible substrate must elevate faecal weight, even those that are completely fermented. Variance arises due to dose and extent of fermentation. Studies failing to show effect are likely confounded or simply underpowered for the diet consumed. Some diets have higher day-to-day or week-to-week variability on ‘basal’ faecal weight. • Dose response meta-analysis was not conducted though should have been.	SACN thanked the respondent for their comments.
Page 40 9.24 - 9.25	“No effect” and “limited evidence” for short-chain fatty acids. • No significant effect is expected at low to zero dose.	SACN accepts that effects on faecal pH and short-chain fatty acid content might be observed if sufficiently high doses are given but there is insufficient evidence to

Reference	Comment	Action agreed by SACN
	• Effect is expected at a sufficiently high dose. • A dose response meta-analysis should have been conducted (the artificial limit of 10 studies being needed for dose response analysis is trumped by expectation of dose responsiveness when there are as many as eight studies (at least eight studies). • The conclusion of “No effect” is premature” • It is unclear whether or not the evidence is unduly limited.	evaluate this possibility. SACN stands by the conclusion as written in the report.
Page 40 9.26	Fructo-oligosaccharides and bacterium. • The report is unclear about whether lower doses of FOS show no effect or show a non-significant effect or that too few studies had been conducted to be sure about an effect or whether there were no satisfactory studies identified on FOS taken at below 10g/day. • Given the lack of success on finding studies on inulin (above), the successfulness of the search for relevant studies on FOS remains unclear.	SACN feels that the report accurately summarises the current state of knowledge.
Page 40 9.31	Inulin and faecal bacteria • Given the lack of success on finding studies on inulin (above), the successfulness of the search for relevant studies on inulin in this section is unclear. • Given that there was no attempt to weight observations from the various trials, it is unclear whether the “No effect” is a valid conclusion. • It is unclear whether the effect of inulin is dependent upon molecular size and processing, some studies may have used polymeric inulin rather the oligosaccharide inulin. Some process potentially may degrade inulin	The studies highlighted earlier by the respondent do not meet the report’s inclusion criteria or were not written in English. SACN has considered all the evidence which met the reports inclusion criteria and no evidence was highlighted by members or consultation respondents. SACN therefore considers that all relevant studies have been identified and so stand by the conclusions as written in the report. The following sentence has been added to the end of paragraph 9.31, *“It is possible that this inconsistency*

Reference	Comment	Action agreed by SACN
	to be more like fructo-oligosaccharides. • Critical examination of studies is needed following a search that is thorough.	*reflects inconsistencies in the average molecular weight of the inulin supplements used in these studies."*
Page 40 9.32 -9.34	Inulin and other non-digestible oligosaccharides, and calcium absorption. • Other non-digestible oligosaccharides are not defined. • Observations on inulin should be presented separately from other Non-digestible oligosaccharides. • No-effect is observed in adults, contrast children and adolescents. It is unclear whether or not results in adults may be conditional. • It is unclear whether the methodology applied in adults is the same as that in children and adults.	SACN feels that the report accurately summarises the current state of knowledge and stand by the conclusions, which reflect the empirical evidence judged according to *a priori* criteria.
Page 41 9.35 - 9.37	"No effect [for Retrograde resistant starch and energy intake]". • Study precisions were far too poor to draw conclusions about clinically significant effect sizes for any substrate including resistant starch [studies were not adequately powered]. • The dose, duration of treatment, and energy values applied to the resistant starch are unclear.	SACN feels that the report accurately summarises the current state of knowledge and stand by the conclusions, which reflect the empirical evidence judged according to *a priori* criteria.
Page 41 9.38 - 9.62	"No effect [for Retrograde resistant starch and faecal weight]". • Dose-response meta-analysis should have been reported. • The response may depend on the origin or structures of the resistant starches and caution should be given about generalisation, especially given apparently incomplete analysis.	The respondent has copied the conclusion incorrectly. SACN concluded that there was an effect for retrograde resistant starch and faecal weight. SACN stands by the conclusions, which reflect the empirical evidence judged according to *a priori* criteria.

Reference	Comment	Action agreed by SACN
	• Stability of outcomes have not been assessed.	
Page 41 9.43 - 9.62	"Effect [for Retrograde resistant starch and Faecal pH and short-chain fatty acid content]". • Insufficient information is reported as the Report describes a comparison of positive effects of unreported amounts of RS with neutral effects of specified amounts of RS in both 9.44 and 9.45. • It is unclear whether overall there is a significant effect, whether there is a dose-response effect, and whether claim of effect is generalizable ("in general"). • Whether or not the results from these studies are truly insufficiently comparable is not clear, no reason has been given for insufficient comparability and there is no evidence of attempt to generate a common metric, and no attempt to explain why contrary outcomes have arisen.	SACN recognises the complexity of the literature under review; however feel that the report provides an accurate summary of current knowledge.
Page 41 9.49 - 9.50 Infants, children and adolescents	Calcium absorption and non-digestible oligosaccharides. • Observations on inulin and GOS should have been presented separately from 'other' non-digestible oligosaccharides. • "demonstrated" in 9.50 is too powerful a term because the evidence is limited to "Moderate evidence" and for reasons given above under the heading "**9.32 to 9.34 Inulin and other non-digestible oligosaccharides, and calcium absorption." • Saying 'because no evidence was found after combining 4 studies in adults' would be more accurate, and saying 'reasons for not finding effect in adults' would be better.	For children and adolescents, all trials use FOS alone or in combination with inulin. In the conclusion box , '(fructo-oligosaccharides)' has been included after the term non-digestible oligosaccharides.

Reference	Comment	Action agreed by SACN
Page 41 9.51 - 9.53	Non-digestible oligosaccharides and infant faecal bacteria up to 3-mo age • It is unclear whether the update search results were related to inulin (having said there is only one study on inulin this is highly relevant). • The range of types of non-digestible oligosaccharides is not made known in the report. • It is insufficient to say that six trials reported no significant effect without demonstrating that the studies had sufficient power to detect an effect. • Aside the problem immediately above, were these individual studies in agreement over the direction of the non-significant effects? • Were reasons for non-significant effect in some studies identified, such as methodological or inadequate dose, duration of study?	The respondent's main criticisms arise from the assumption that it would have been feasible in this report to examine the question to a level of detail that would be appropriate for a review dealing with this particular topic alone. A distinction has been made between studies on inulin and studies on FOS or other oligosaccharides. SACN thanked the respondent for these comments. However, SACN stands by the conclusions, which reflect the empirical evidence judged according to *a priori* criteria.
Page 42 9.56 - 9.57	9.56 to 9.57 • "Content" is undefined, mg/d or mg/100g stool or other unit?	The units differ between studies; there is no useful purpose in stating the units separately for each paper.
Page 42 9.59 Summary and conclusions	• "no evidence" is ambiguous. Suggest 'no trials' or 'evidence not supporting'. • "relevant health/disease outcomes". Be specific, either 'health or disease' or 'factors risking health or disease'. "Relevance" is non-specific, apparently lazy, and suggests both unclear thinking and lack of systematic consideration.	The text in the report has been amended to address the ambiguity highlighted by the respondent. SACN thanked the respondent for their other comment; however stand by the phrase as written in the report.
Page 42 9.61	• There is evidence from within the report that the literature searches were not successful in capturing all available evidence. For example, there is one published meta-analysis on inulin that concludes a lowering	As the respondent did not cite the meta-analyses which they refer to, SACN cannot comment. The studies highlighted earlier by the respondent do not meet the

Reference	Comment	Action agreed by SACN
	of plasma triacylglycerols and another that suggests no-significant effect. The present study appears inferior to each of these, and really ought to have addressed the prior published meta-analyses and attempted conditional reasoning for discrepancies between studies. • It is unclear whether information presented adequately fits the groupings "children and adolescents". References to earlier paragraphs would be helpful to create a link to the evidence and enable a check that what is stated is supportable.	reports inclusion criteria or were not written in English. SACN thanked the respondent for their other comment; however considers that the information/wording as written in the report is appropriate.
Page 42 9.62	• Comments herein suggest the studies reported do not have the power to draw the conclusion reached concerning energy intake effects of resistant starch. Moreover, there is concern about whether the studies were sufficiently meticulous to address the question asked. The conclusion when reached is almost certain to be conditional depending on scope for caloric control via energy restriction or for unrestricted access to energy and for dose.	SACN feels that the report summarises the current state of knowledge to a level of detail appropriate to a review of this type. SACN stands by the conclusion as stated in the report.
Page 42/43 9.63	• The summary concludes, amongst other things, that "The effects on faecal parameters demonstrate the colonic fermentation of these carbohydrates". However, the report presents no evidence on fermentability of these carbohydrates and therefor the summary misrepresents the evidence. The same results could well be obtained by magnesium sulphate that is non-fermentable, or even the drug metformin, which we would not explain as due to its fermentability. Moreover non-fermentable carbohydrates are expected to increase faecal weight and acidification may be due to shorter transit time. Far from "demonstrating" the results provide no evidence on fermentation. • The language used is unhelpful to either consumers or health professionals. "symptoms" to many ley persons usually implies a disease process, but there is no suggestion from the data that there is any such process or safety issue [13].	The reference to fermentation has been removed and the sentence amended. The term "symptoms" has been deleted and the text has been amended. SACN feels that the wording appropriately summarises the

Reference	Comment	Action agreed by SACN
	• The last two lines of para 9.63 (“; equally….”) add nothing. Already it is questioned whether there would be health outcomes. It would be preferable to state that ‘elevated bifido, faecal weight, and butyrate are potentially of benefit to health, but for the present such benefits are largely hypothetical’. (This applies also to many ‘markers’ of cardiometabolic risk.) • The search criteria does not include bifidobacteria (or other micro-organisms) or short-chain fatty acids, it would be reasonable therefore to assume all caveats arising in the draft report related to these measures of outcomes might have only limited justification.	current state of knowledge and the uncertainties with regard to the relevance for health. It is possible, but unlikely, that relevant papers meeting SACN criteria were missed, and there was further opportunity for such papers to be highlighted by the wide range of experts in these areas who responded to the consultation.
Page 43 9.64	“relevant” is lazy, undefined. Please state which health outcomes. • The paragraph is long and states very little. Indeed it would add nothing that could not be achieved with minor modifications of the earlier paragraphs (as suggested herein). • Loss of the last half of the paragraph would be no loss to the science and would be essential for having a punchy summary; it would also eliminate what might be reporting bias.	SACN considers that the text does not need to be amended. The health outcomes SACN considers ‘relevant’ are clear for the context of the total report. SACN thanked the respondent for this comment. The text has been amended.
Page 43 10.3 Chapter 10 glycaemic index and load	“measures of the glycaemic characteristics of the diet” • Strictly, they are measures of the glycaemic characteristics of foods used to estimate the glycaemic characteristics of diets.	SACN considers that the text does not need to be amended. It is conveying what the measures are used as, not what the measures are.
Page 43 10.3	“The GI is a relative measure of the plasma glucose response induced” • Strictly, ‘since standardisation GI is a relative measure of the capillary blood glucose response induced …’	SACN considers that the text is sufficient. The additional details are in cited references eg Brouns et al, 2005.

Reference	Comment	Action agreed by SACN
Page 43 10.3	"quality and quantity of carbohydrate" • This one may seem pedantic, however, it is the 'quality of the carbohydrate food/meal/ingredient and the quantity of carbohydrate in the food/meal/ingredient'. This recognises that GI is a measure for the food/meal/ingredient (not the carbohydrate) because the GI is affected by non-carbohydrate in the food/meal/ingredient as well as the structures and composition of the carbohydrate in the food as eaten.	SACN thanked the respondent for their comments. The text has been amended to read "…therefore taking into account both the quality of the carbohydrate food/meal/ingredient and the quantity of carbohydrate in the food/meal/ingredient consumed."
Page 44 10.4	GI and GL units • Neither GI nor GL are unitless. Moreover, both are linked to a particular standard but the draft Report doesn't state which applies here (e.g. % of glucose or % white bread, and g/d or g/2000kcal etc).	The report does not say that glycaemic index and load are "unitless", and describes their relationship to test references.
Page 44 10.4	Two GI unit increment….and…20 GL unit increase. • Why 2 and 20? The SD's are reported in this para to be 5 for GI and 26 for GL. Isn't 1 SD the SACN standard for reporting for the project? Why is the data presentation biased in this way? • Also, it ought to be recognised that adoption of SD values for the UK can give a false impression of the importance of GI and GL among and across other world regions because the SD value is greater worldwide and can be greater, too, in regions other than the UK.	The exact values do not matter because it is straightforward to convert from one choice of increments to another with identical conclusions. To convert an estimated RR from an increment of x to an increment of y, raise the estimated RR to the power of y/x. The aim was to present results using meaningful increments that offer both a noticeable change in intake, whilst also being achievable. Numbers were loosely based on cited publications, heavily rounded, and sometimes influenced by the choice of increment commonly used in the papers reviewed. But the choice of increment is purely cosmetic and does not change the conclusions or implications.
Page 44/45 10.5	"The difference between these two types of trials is that the glycaemic index trials do not vary carbohydrate quantity, but change the quality to modify the GI. The GL trials reduce carbohydrate intake, resulting in a higher proportion of fat, often including saturated fatty acids, and/or protein intake, as well as changing the carbohydrate quality to modify the	SACN is unable to respond without examples of where the

Reference	Comment	Action agreed by SACN
	GI” • Although the paragraph may appear clear, in the context in the Report’s mention of effects on macronutrient intakes, weight loss and confounding of GI and GL trials by weight loss, the paragraph and immediate following sections give a false impression of GI and GL and how trials can modify these quantities, macronutrient intakes and body weight . • GL trials can aim to modify GI, protein, fat, fibre, etc. etc. GI trials modify GL only by exchanges of foods of different GI and carbohydrate content. Such GI trials also aim to balance changes in protein, fat, fibre, etc., with the specific objective to balance differences in composition between foods of lower GI used in place of foods of higher GI. • As a side issue; this balancing act might not take place among free-living persons when choosing lower GI in place of higher GI. Even in studies aiming to achieve such balances they can fail. Thus outcomes depend on the circumstances: (Livesey et al 2008 [10, 14]). Thus lower GI trials of ad libitum food intakes have been associated with lower energy intake (from available carbohydrate, protein, and fat) but not lower dietary fibre intake. Trials of lower GI under conditions of controlled energy intakes have shown only minor changes in diet macronutrient intakes. Trials of intermediate levels of control of food intake show intermediate effects [14]. • The Report’s comment that trials on GI and GL induced some weight loss may be used in the Report unduly critically. Reduction in GL can induce weight loss as shown in randomised controlled trials [10]. Potentially this is a part of the mechanism (not a real confounder). Nearly all dietary trials result in weight loss – likely more so among persons in an overweight environment and especially as they regain ‘food consciousness’, but also because where food selection is concerned, aiming for a new goal limits food choices - at least until the new approach to eating is learned.	respondent believes the text leaves a 'false impression'. The text has been revised to reflect the points raised by the respondent. The comments in the Report are relevant because the presence of variable weight loss clouds identification of cause-effect relationships, including where this is a proposed intermediary mechanism. This is because it is not clearly an intrinsic response to the change in diet GI/GL (glycaemia) itself, but potentially attributable to independent but co-related effects of the manipulation used to achieve a change in glycaemia (GI/GL).

Reference	Comment	Action agreed by SACN
Page 45 10.6 - 10.7	"No association" and total cardiovascular disease events" • Total cardiovascular disease events need defining here, even if defined elsewhere not found in the draft Report. • What events were included? What events were excluded? Were FFQ adequately validated in each included study? Was exclusion of studies undertaken when the correlation for the FFQ was 60 or less, for example? Were studies included that did not demonstrate their own validation of FFQ (for example most EPIC study centres do not report independent validations)? Were studies of low validity for carbohydrate also excluded? • Men and women may differ. Women being more susceptible than men for a GI-CHD relation, and perhaps men more susceptible than women for a stroke event, these perhaps tending to cancel out each other in a total cardiovascular disease all sexes combined analysis (or causing apparent non-significance even when there is a real association). Mixing nearer no association with association would be a sure way to get borderline significance/non-significance as reported in the Report. • Given the above it is questionable whether the borderline non-significance reported is interpretable. Mixing a near no association with association would be a sure way to get borderline significance/non-significance as reported in the draft Report. • The conclusion of "No association" is wrong for the data available in the literature, this SACN activity definitely needs to be updated and executed correctly.	This is described in the Cardiometabolic health protocol, Section 5.8. SACN did not undertake a separate quality assessment of the specific FFQs or other dietary instruments used in these published studies. There was no *a priori* hypothesis for such gender differences in the risk assessment, which was carried out to establish recommendations for the general population The respondent has not identified any specific studies which should have been included and would have influenced this conclusion in the suggested direction. SACN has acknowledged the borderline statistical significance of the association, and that the evidence for the conclusion of 'no association' is limited. Such circumstances inevitably mean that the conclusion is more susceptible to being strengthened or changed by future new data.
Page 45 10.8 to 10.9	"Coronary events" and "No association" • This needs to be defined even if defined elsewhere. • The conclusion here differs from those in published meta-analyses!!!! • It is certain that r the present meta-analysis has not been conducted	This is described in the Cardiometabolic health protocol, Section 5.8. It would be too much detail to define it here. It is common for meta-analyses to reach different conclusions, depending on inclusion criteria and period over which evidence is considered. The SACN processes are described clearly in the report; therefore SACN stands

Reference	Comment	Action agreed by SACN
	adequately (cf above for total coronary events).	by outcomes and conclusions as written in the report.
Page 45 10.10-10.11	Stroke and GI. • It is unclear whether the meta-analysis results includes the 2 studies in the update search and others since if published. • It is unclear whether the literature is up to date (to within six months of the reports intended publication date).	SACN generally did not include studies identified in the update search in the meta-analyses. The literature is considered up to date as no members or consultation respondents have highlighted additional relevant studies.
Page 45/46 10.12-10.13 Blood pressure and GI.	Blood pressure and GI. • It is unclear whether the meta-analysis results include the 2 studies in the update search. • It is unclear whether the literature is up to date (to within six months of the reports intended publication date).	SACN thanked the respondent for their comments. The relevant paragraph has been amended to: "The meta-analysis of four trials demonstrates no significant effect..."
Page 46 10.12-10.16	Fasting total-, LDL-, & HDL-cholesterol & triacylglycerol and GI. • The discussion in 10.16 and in the boxed conclusions is somewhat lazy, it implies rejection of effects of GI on these blood lipids if secondary to effects of GI on bodyweight—without evidence. An unbiased approach would be to state that 'the effects may be primary to reduction in GI whether directly or indirectly via effects on body weight. Effects on body weight may be confounded by factors other than GI.' Etc.	SACN thanked the respondent for their comments; however the wording as written in the report has been maintained.
Page 46 10.21-10.22	"(C-reactive protein)". • No meta-analysis is mention. It is unclear whether meta-analysis would reveal a significant effect, which is one objective of meta-analysis, to improve power of observation to a greater level than in small studies with non-significant results.	SACN generally did not include studies identified in the update search in the meta-analyses. There was insufficient data identified in the original search to perform a meta-analysis.
Page 46	"Eating motivation" , "No effect" and "moderate evidence".	SACN thanked the respondent for their comments;

Reference	Comment	Action agreed by SACN
10.23-10.24	• So many factors affect eating motivation. To date all such studies (whether or not about GI or GL) appear to lack sufficient power to yield stable and clinically relevant effects. • A claim to no effect needs to be qualified. • A claim of moderate evidence fails to recognise that study protocols have not yet reached a suitable stage of development to address low but potentially meaningful differences in eating motivation.	however the wording as written in the report has been maintained. SACN did not consider in detail the power of individual studies to address outcomes. This limitation has been acknowledged in the report.
Page 46/47 ****10.25-10.26	"Type-2 diabetes" and GI • The analysis includes results from some studies rejected by other meta-analysts for inadequate FFQs. • Inadequacy of FFQs relates to their validity (poor correlation between FFQ used and a better measure for the food component/factor under study). • If there is a poor correlation during validation, there is a greater likelihood of poorer correlation, and higher risk of confounding, when attempting a correlation with incident disease, such studies are generally biased to the null. • Several; of the studies also has FFQs that were not validated within the population studied, so has a doubtful FFQ. • Most studies did not validate their FFQ for GI, though did validate the FFQ for carbohydrate, which is important in that diet GI is weighted by carbohydrate intake so requires FFQs to be adequately validated for carbohydrate at least. • It is unclear whether GI values used in the meta-analysis are adjusted for energy intake according to Stampfer and Willetts method. If not they will be biased towards null. • For any one of the above reasons a meta-analysis result can be rejected, thus there are several reasons to reject the meta-analysis result	The methods used in the SACN meta-analysis have been clearly described elsewhere in the report. It is well recognised that conclusions of meta-analysis are dependent on inclusion criteria, and that meta-analyses may reach differing conclusions for this reason. Based on the pre-defined methodology, SACN stands by the conclusions as written in the report.

Reference	Comment	Action agreed by SACN
	in the present draft Report.. • From the forgoing, the Report result will be biased towards marked underestimation of the role of GI in prevention of type-2 diabetes.	
Page 47 ****10.27-10.28	"Fasting blood glucose" and GI, and "No effect" • It has been established (independently of regression to the mean) that lower GI and GL can elevate fasting blood glucose in those persons with rested and fasted morning plasma glucose <5mmol/L, but lower it in those with fasting blood glucose > 5mmol/L (online supplement to Livesey et al 2008 [10]) – thus it appears that low GI is normalising of blood glucose. • It is not surprising, therefore, that combing results from all such studies reveals little effect, as indicated in the 'meta-analysis' conducted for the draft Report. • The conclusion of no effect is therefore premature, and for the present can be rejected.	Based on the pre-defined methodology, SACN stands by the conclusions as written in the report.
Page 47 ****10.31-10.32	"Insulin sensitivity" and GI, and "No effect" • There is no mention of attempts to create a common metric for these studies. • There is no mention of any temporal effects, since earlier studies of shorter duration generally indicate improvement. • It is unclear whether duration of intervention is a significant factor in these studies. • It is possible that increasing duration of study associates with lowering of power of these studies (error become larger over time). • These considerations are significant because small effects in the right direction may mount-up over time.	There was no attempt to create a common metric. SACN included studies only of a minimum duration, as outlined in the methodology described in chapter 1 and annex 2 of the report. SACN did not conduct any analyses to assess the impact of time on effect beyond this. Based on the methodology, SACN stands by the conclusions as written in the report.

Reference	Comment	Action agreed by SACN
Page 47 *10.33-10.34	"Colorectal cancer" and "No-association" • It remains to be established whether a no-association is due to inadequate FFQs (cf comments immediately above). • The issue of adequacy of FFQs may also apply to studies of 'total or available carbohydrate' intake, and possibly other nutrients [2, 4, 15].	SACN thanked the respondent for their comments. The limitations of food frequency questionnaires are mentioned in the report.
Page 47 Glycaemic Load *10.35-10.36	"Total cardiovascular events" • Total cardiovascular events is undefined. • It is unclear which variable are confounding. • No attempt is described to eliminate potential co-variables. • It is unclear whether the comment that "it is not possible to exclude confounding variables" has specific information supporting it or whether the comment is just a repeatedly lazily stated bias against prospective cohort studies in favour of intervention studies or whether it is stated whenever there is a feeling of bias against the effectiveness of an intended nutrient of dietary factor. Because nutritional intervention studies are difficult to fully control, the issue of confounding arises there too but is often overlooked or suggested is negligible, but upon detailed analysis can be found statistically significant and of importance (Livesey, et al 2008 [10]).	The term total cardiovascular events is described in the Cardiometabolic health protocol, Section 5.8. Section 2.20 sets out some of the key confounding factors affecting interpretation of GI/GL studies.
Page 48 *10.39-10.40	"Fasting total-, LDL-, HDL-cholesterol and triacylglycerol" and GL • The results are most pertinent to those striving for weight reduction. The majority of the population is 'walking' into weight gain. • Thus Reports results are not relevant for the majority of the population until they start to take measures to lose weight.	SACN thanked the respondent for their comments.
Page 48	"(C-reactive protein)" and GL	SACN's conclusions are in keeping with the methodology

Reference	Comment	Action agreed by SACN
*10.41-10.42	• Too few studies were analysed to establish stability of this result. • "No- significant effect" is meaningless if studies were underpowered or not representative, so more detail needs to be presented to be convincing. • No meta-analysis appears to have been conducted. • Studies may have been too short in duration. At least one epidemiological study in initially healthy persons (and one RCT in healthy persons and one intervention study in T2DM modifying GI) has indicated clinically significant association over the longer term.	outlined in chapter 1 and annex 2 of the report. SACN considers the wording of paragraphs 10.41 and 10.42 to be appropriate and stand by the conclusions as written in the report.
Page 48 ****10.43-10.44	"(Body weight)" and GL • Too little information is presented to claim no-effect. • Studies of short to long (12 mo) duration have previously shown effect when meta-analysed with time as non-linear covariate, and when GL reduction is sufficient, and vice versa (Livesey et al 2008 [10]). • It appears probable that collection of insufficiently data and performance of inadequate analysis could be the problem underlying the claimed no-effect.	SACN's conclusions are in keeping with the methodology outlined in chapter 1 and annex 2 of the report.
Page 48/49 ****10.45-10.46 "Type-2 diabetes" and GL	• GL has units, a statements of unit/day is somewhat lazy reporting. Unit is not expressed. • Moreover, original studies report g GL that are adjusted to a mean or median reported energy intake, which varies among studies. This expression (g GL reported/amount of energy reported) does not have the errors implicit in g/day for data collected from food frequency questionnaires. • A comprehensive meta-analysis of more studies than in the SACN draft Report has already been published (Livesey et al, 2013 [3, 4]) but not	The meta-analysis highlighted by the respondent has been cited in the report.

Reference	Comment	Action agreed by SACN
	referred to in the Report, finding: • Association, RR 1.08 per 20 gGL/2000kcal – average for men and women • Significant in both men and women. • Heterogeneity reduced to 2% by three out of four pre-published hypothesized factors: 1. Significantly higher RR in women than in men. 2. Significant dependence on the FFQ correlation for carbohydrate, implying the studies have markedly underestimate the importance of GL. 3. Ethnicity, significantly higher values in studies of European-Americans versus all other ethnicities combined. • No significant effect of duration of follow-up due to instability about this factor (inadequate number of very long term studies, >15y). • Significance of effect at all doses >95g GL/2000kcal. • Stability of outcomes over increasing number of studies (except for duration of follow-up >15y). • Stability against a wide range of potential confounders that were explored. • Discussion that reduced GI could achieve sufficient GL reductions except at very high intakes of GL when carbohydrate reduction would also be required to meet an optimum target GL of 100g/2000kcal—chosen as a rounded value closely above a lowest point of significant effect on the dose-response curve.	
Page 49	“Fasting blood glucose [and] No effect” and GL	

Reference	Comment	Action agreed by SACN
****10.47-10.48	• Really needs to consider <5mmol/L and >5mmol/L separately or in a meta-analysis with treatment average fasting blood glucose, fibre intake and GL dose modelled in. • "No effect" is doubtful. Studies including shorter duration show significant effects of severity of abnormality of fasting glucose concentration (including <5 mmol/L), fibre intake and GL (or GI) as determinants in an appropriately structured meta-analytical model (Livesey et al [10]) • Combining all studies together (<5 mmol/L and >5mmol/L) can be suspected to average out as no effect among healthy persons (though sufficient observations are needed to show difference above and below 5mmol/L, such as in Livesey et al 2008 [10]. • For some purposes, analyses excluding pre-diabetes and diabetes from the analytical model has some limitation when fasting blood glucose can be considered as a continuum throughout the range. The exclusions of 'pre-diabetes' [term disliked] and diabetes make artificial cut points relevant to clinical issues rather than discontinuations in a continuous variable. • It can be considered that the no-effect reported in the draft report could be due to insufficient detail and range of results in the analytical model. • In addition, studies of too long duration (beyond achievement of steady state) may lose power compared with studies of moderate duration. • In view of all the above, the reported "no-effect" in the draft Report might be misleading.	No *a priori* reason was provided to consider these specific glucose thresholds. SACN pre-specified the minimum duration of studies that would be considered. SACN excluded patients with diabetes and treated fasting glucose as a continuum. The suggestion here about a continuum is inconsistent with the approach recommended elsewhere of dichotomising studies using a 5 mmol/l threshold.
Page 49 ****10.51-10.52	"Insulin sensitivity/resistance [and] No effect" and GL • Information is too limited to be convinced of a no effect. • No effort seems to have been made to find a common metric. • Modification of carbohydrate intake is expected to modify GL and in the	SACN considers that the text is appropriate as written. Substantial differences in insulin assays make this impossible.

Reference	Comment	Action agreed by SACN
	short term influences insulin sensitivity/resistance.	SACN's conclusion reflects the evidence rather than theory.
Page 40/50 10.55	Outcomes with insufficient evidence (tables 10.1, 10.2, 10.3) • The criteria for deducing this is unclear, as sometimes no-effects are concluded when there is insufficient evidence, especially as currently presented in the draft Report. • Being able to undertake a meta-analysis with sufficiently low I^2, and being able to establish stability of effect, each seem not to be among any criteria. • The veracity of the lists is unclear. At least the searches performed are not up-to-date. • The accuracy of Table 10.3 is doubtful. It may be more a matter of need for more evidence to apply appropriate analyses to rid the collection of studies of heterogeneity. Inconsistency may imply inaccuracy of studies, but it may be inaccuracy of the models used for analysis of the studies and/or having sufficient numbers of studies to reveal factors hypothesised as explanatory. • Cumulative meta-analysis ought to have informed this table.	SACN stands by the conclusions, which reflect the empirical evidence judged according to *a priori* criteria. Evidence is considered insufficient when there are too few studies or trials that meet the inclusion criteria. The criterion used to grade evidence is outlined in annex 2. Summary of review methodology.

Reference	Comment	Action agreed by SACN
Page 50 Chapter 11	Dietary reference values. • The chapter is too long on sugars and includes too much unnecessary speculation.	As SACN concluded that the present DRV was too high, there needed to be sufficient consideration of the proposed revised value. The concern expressed in many quarters about dietary sugars required a detailed consideration of the evidence.
Page 50 11.3-11.4	Carbohydrate intake. • There needs to be a further statement that there is some evidence that high intake may be detrimental to health. This arises from various sources, some of which are mentioned in the Report, others elsewhere (Livesey et al 2013 [3]) when examining glycaemic load), and still others in relation to plasma triacylglycerol, which has great relevance amongst advice for patients with type 2 diabetes when essentially all National diabetes association's include advice to cut by 10% carbohydrate intake and replace with MUFA. • The analyses conducted fail to consider that too much carbohydrate and too much fat can each be detrimental to health, and that replacement of one by another then has no or diminished observable effect, whereas the real effect is to maintain detriment. Concern might be better focused on the quality of the carbohydrate food and quality of the fatty food, rather than the outdated fat versus carbohydrate debate.	SACN saw no evidence that contradicted the view that the previous DRV should be retained. The issue of GL is acknowledged in the report, but the current state of the science around GL and the difficulty in obtaining reliable assessments of the population intake means that setting a recommendation related to GL is not feasible. SACN has clearly indicated where certain carbohydrate components or specific food sources can be associated with adverse health risks.
Page 50/51 11.7	high-fructose corn syrups (isoglucose). • The report perpetuates a common mistake. • Isoglucose and high-fructose corn syrups are not the same thing and should never be used interchangeable synonyms. The two should be listed separately.	The report has been amended to state that high-fructose corn syrups are an example of different predominantly 'free' fructose and glucose mixes.

Reference	Comment	Action agreed by SACN
	• It would be appropriate to list product types which are essentially free sugars, such as free-sugar extracts and syrups (e.g. agave nectar, syrup etc.). "it is proposed that the UK adopts the definition of 'free sugars'" • Free sugar is sometimes used to mean monosaccharide (e.g. fructose not in sucrose). • Free-sugars might also be confused with sugar-free, which already is in use in food labelling. • The proposal is too strong, and omits the need for further consideration by regulatory authorities. • It would be appropriate to recommend that the UK consider dropping "non-milk-extrinsic sugars" to be replaced by another term understandable to the consumer, that facilitates analysis, and that reflects recent knowledge about sugars and health. • It would be further appropriate to recommend the UK considers adoption of other terms, such as added sugar as used in the EU. • In selection of a term, it would be appropriate to consider a term that meets consumer understanding, such as 'added sugar'. • In selection of a term it would be appropriate to consider how the sugars, however called, would be analysed. • It is not impossible that Added sugar could be used for consumer understanding, while being measureable as something else (e.g. some standardized approach to non-sedimentable sugars). • Algorithms exist for the estimation of added sugars, those in use are not satisfactory which is breeding attempts for improved algorithms, but there are still problem foods.	Consideration of the types of foods / products containing free sugars was beyond the scope of this risk assessment process and is part of the subsequent risk management which PHE and DH will engage in. The free sugars definition which SACN recommends for use in the UK is clearly stated. The report makes it clear why the term free sugars has been recommended instead of added sugars, and SACN believes that free sugars is the most helpful term for characterizing the relevant dietary component (exposure) of interest.

Reference	Comment	Action agreed by SACN
	• It is not a simple issue and it would be inappropriate to jump straight into change without further consideration: 'consider' being the key term to use in any proposal here.	
Page 51 11.8-11.13	11.8-11.13 Advice on sugars. • The advice makes no distinction between sugars in foods and sugars in drinks (only that in drinks, e.g. fruit juices and sugar sweetened beverages is associated with diabetes. It is unclear whether this outcome is linked to sugars or carbohydrate energy in drinks, artificially sweetened maltodextrin-based drinks might well do the same, ditto lipid-based drinks, and there is evidence that carbonated drinks without sugars are linked to diabetes type 2. It is also unclear whether the absence of milk drinks or the presence of sugary drinks that is linked to diabetes, especially that milk protein impact on glycaemia in both healthy persons and type-2 diabetes patients, while sugary drinks displace milk drinks. • The advice regarding caries makes no distinction between the amount of sugars and the duration of contact of sugars in the mouth/pattern of consumption, the amount is not necessarily the issue.	The reviewed evidence relates to all sources of sugars and so making a distinction between food and drinks is not appropriate. This report is concerned with carbohydrates and so lipid containing drinks or artificially sweetened drinks are not the focus of the report. The evidence showing an association between SSB and an increased risk of T2DM does not have enough granularity to reliably identify which drinks are consumed less if SSB are consumed more, so while this point may illustrate an interesting future research topic, it cannot form part of any conclusions. SACN found no evidence of an association between frequency of sugars consumed and dental caries; however this may be due to the lack of evidence rather than there being no evidence. There is a difference between advice given on an individual level and a public health message. From a public health stand point the available evidence in the report indicates that the amount of sugars is a significant variable. While amount and frequency of sugars consumption are highly correlated, frequency is a difficult indicator to measure. This is possibly the reason why there is much less evidence to support an association between frequency of consumption and dental caries. These points have been highlighted in the report.

Reference	Comment	Action agreed by SACN
	• The presented rationale with respect to sugars is unclear in scope and includes suggestive and inferential statements (“suggests”, “implies”, “and thus”). Limiting the advice to only evidence-based narratives would be appropriate. • There is little to put the data on sugars and energy balance into the context of obesity. There is no evidence that obesity is increased by more than 2-3 kg due to sugars consumption. There is no doubt that energy is involved but it is unclear in what way, and to what extent. Do sugary drinks increase energy intake when they are not prescribed to be taken daily? What is the evidence from sugar reduction strategies? Among populations does sugar reduction elevate fat intake?	SACN considers the suggestive and inferential statements to be appropriate given the nature of the evidence. The overall opinion of SACN is that the totality of this evidence is sufficient to enable the conclusions to be made, but it is acknowledged that in some areas further work is needed to explain the mechanisms of the effects or associations. Putting the evidence and conclusions into the context of obesity is something to be done after this report is completed. The report describes studies in which high sugars intakes in an *ad libitum* setting were associated with increased body weight or indices of fatness, and SSB intake in children is also associated with increased weight /fatness, all of which increase the risk of developing obesity. A 2-3kg mean increase in body weight in a meta analysis or a population is not a trivial amount. SACN refers the respondent to the evidence base of the report, which includes free-living subjects and examples of treatment exposures using sugar 'supplementation', 'substitution' and 'reduction'.
Page 52 11.9	“Although there is limited evidence relating to sugars intakes below 10% of energy intake, there is little reason to doubt that the relationship continues to be approximately linear at lower percentages of energy from sugars”. • Does this section need speculation to support the argument made. Reason (no evidence) has been given elsewhere herein.	SACN thanked the respondent for these comments. The text has been amended.
Page 52 11.10	“This figure assumes no dietary compensation for the additional energy supplied in the higher sugars diets, which may not reflect true dietary	SACN thanked the respondent for these comments. The text has been amended.

Reference	Comment	Action agreed by SACN
	behaviour and, therefore, the estimate should be treated with some caution." • The speculation here is not warranted. The weight gains are well below expectations for no-caloric compensation. Indeed it is evident that >95% compensated occurs within 1 year (Livesey et al,2010[16]). Once again the draft Report's argument over relies on speculation. Speculation can never be a "useful guide".	Paragraph 11.10 simply aimed to illustrate how the recommendations on free sugars could contribute to the Calorie Reduction initiative. The Calorie Reduction Expert Group made it clear what the current population weight gains represented in terms of daily positive energy balance, but also recommended the higher figure of 100kcal /d should be removed from the diet to not only prevent weight gain but also achieve some weight loss. Of course if there is no reduction in energy intake there will not be the desired effect on body weight. This paragraph simply shows that a reduction in energy intake would be helpful in terms of reducing or even reversing population weight gain.
Page 52 11.11	"Since free sugars intake is a dietary factor shown to increase energy intake [under conditions of prescription to increase sugars intake], decreasing the population intake of free sugars is a step that could be taken to help reduce the current UK over-consumption of energy". • The question is: How can this be achieved effectively. Where is the evidence from practice? Where are the ≥12 month studies relevant to body weight, which is the primary need for compliance with the exclusion criteria. • A clearer, focused, rationale would be helpful. A simple rationale is that added sugars are non-essential, are understood by the consumer, are an easily identifiable source of energy (on food labels when presented as added sugar), are consumed among the UK population which has a high prevalence of overweight and obesity and associated health issues, and can be reduced from the diet without known adverse effect. Governments	The rationale for a reduction in free sugars is quite clear – it would benefit oral health and would reduce the risk of passive overconsumption of energy and thus help with weight management if it could be achieved. The quoted statement *per se* says nothing about body weight, only that this step is likely to be beneficial (rather than neutral or adverse) in reducing risk of excessive energy intake. SACN believes this to be a reasonable interpretation and conclusion from the evidence. The single selected reference is not a systematic assessment of the proposition. A number of comments are in the sphere of risk management and therefore beyond the review's scope.

Reference	Comment	Action agreed by SACN
	should be doubtful about the extent to which this would yield valuable results nevertheless without being accompanied by negative views of fat (more specifically fat types), and these two messages alone would still allow negative effects of high glycaemic load from starchy foods. Also one study noted just below (Drummond et al 1998) indicates advice to lower fat and sugar intake together could be less effective for body weight reduction than advice to lower fat intake alone.	
Page 52/53 11.12 Figure 1	• The section speculates and the Figure includes inaccuracies. • None of the studies demonstrated the development of obesity among normal weight persons consuming increased amounts of sugars. • Studies demonstrate a potential to manipulate body weight by approx. 2 kg through manipulations of sugars intake, some studies showing elevation of body weight some shown a decrease in body weight, each compared with a reference group. • The concern here is that overemphasising sugars as the cause of obesity will do little to help identify other causes so leaving the NHS exposed to unacceptable future costs aside the burden of overweight and obesity upon individuals. • Figure 1 is raw, not presentable in the style shown. It gives the impression that the science might be similarly raw, which appears to be true in many places. • Contains no evidence for the Report's claim that 5% sugars results in lower energy intake than 10% sugars.	SACN is unable to respond to concerns about speculation or inaccuracies without concrete examples. Figure 1 was concerned with energy intakes, while anthropometric outcomes are assessed elsewhere in the report. Figure 1 was included in the report for illustrative purposes and the two most comparable groups were included in the figure. However, SACN agrees that it appears misleading and the report has been amended to represent the data in a different manner. Additional RCTs highlighted in the consultation have also been included. Figure 1 was simply a way of illustrating the data which are derived from the papers and supports the conclusion that an effect of lower sugar intakes was a reduced energy intake. It was the judgment of SACN that these data and effect sizes support a reduction in the recommended sugars intakes, and were a contributing factor in the 5% recommendation.
Page 53	• Conditions do not appear to be ad-libitum (Foods were provided.	SACN's judgment was that this range of allowable intake

Reference	Comment	Action agreed by SACN
Saris 2000	Intakes were limited between 75 to 125% of energy requirements. Non-compliers were excluded). • For simple versus complex carbohydrate diets, the difference in body-fat mass at the end of 6 months was about equal to the difference in body-fat mass at the start of the 6 months intervention. No effect. • Ditto for body fat-free mass. No effect.	can in effect be considered *ad libitum*. Notably this range could if anything reduce the likelihood of seeing the observed differences in energy intake. The data extracted from Saris et al. (2000) related to energy intakes, while anthropometric outcomes are assessed elsewhere in the report. However, the study did not meet the *a priori* criteria for inclusion for anthropometric outcomes.
Page 53 Poppit 2002	• Replacement of fat with sugar (and complex carbohydrate) was intended, but it seems the supervising nurse's encouragement to participants to eat more sugar resulted in dietary supplementation with sugar but still no effect on body weight. No effect.	The study's *ad libitum* conditions provided opportunity to compensate for increased sugar intakes. The data extracted from Poppit et al. (2000) related to energy intakes, while anthropometric outcomes are assessed elsewhere in the report.
Page 53 Raben 2001	[a] Raben 2002 only is listed in the reference list. [b] Raben 2002 provide a balanced and fair discussion. [c] Sugar intakes are excessive by any standard, approaching 30% energy. [d] There is no comparative control for seasons or for carbohydrate or fat supplementation. [e] Food intakes were assessed by questionnaire hence one has to be cautious about interpretation of food intakes quantitatively. [f] Sugar (energy) is compared with a sweetener (no energy). The prescription alone might elevate energy intake and leave energy balance positive until control of energy balance is re-established (approx. 1 year when weight gains remain marginal compared with the range of weights from normal to obese, as described for total	[a] SACN thanked the respondent for pointing out that Raben et al (2002) was mistakenly referenced as Raben 2001 in figure 1. [d] [e] [f] [g] The study is only included and interpreted in terms of sugar. In the parallel design any (small) effect of season should affect both groups similarly. A poor quality of dietary assessment would tend to cause a loss of sensitivity and mitigate against seeing the observed differences. The study should be considered within the totality of evidence, which also includes studies where sugar intakes were replaced or reduced. That dietary compensation may not occur in higher sugar diets is a caveat to interpretation that has been acknowledged. [h] The respondent stated that the results from Raben et

Reference	Comment	Action agreed by SACN
	fructose : Livesey 2010 [16]). [g] The study is too short in duration for individuals to fully adapt and to know the impact on energy balance in the longer term (including the giving up on other foods to which persons had habituated). [h] The results from Raben 2002 are said not to be in agreement with those of Saris 2001, but this is not apparent in the figure shown. [i] The authors claim that neither sucrose nor the artificial sweetener stimulated either sucrose or total carbohydrate intake as was suggested previously (author citations 7,10) [j] The conclusion in Raben 2002 is similar to that on wider evidence based reviewed narratively by Livesey 2014 [17]	al. (2002) are said not to be in agreement with Saris et al. (2001). The respondent appears to refer to comments in the paper by Raben et al. (2002), which may be referring to statistically significant effects on body weight. However, the original authors' narrative discourse is not considered in the SACN risk assessment. [i] Stimulation of sucrose or total carbohydrate intake does not appear relevant to the present risk assessment.
Page 53/54 Drummond & Kirk 2003	• The apparent rise in energy intake with %E from sugars in the Figure is entirely due to differences in the energy intake at baseline! • Energy intake in the higher sugar group decreased from 9.70 to 0.39 (-0.31) whereas in the lower sugar group it deceased less, from 8.49 to 8.39 (-0.10). This would suggest the higher sugar diet decreased energy intake not increased it as claimed in the Reports Figure 1.	Figure 1 was included in the report for illustrative purposes and the two most comparable groups were included in the figure. However, SACN agrees that it appears misleading and the report has been amended to represent the data in a different manner. Additional RCTs highlighted in the consultation have also been included.
Page 54 Drummond 1998	[a] Food intakes were assessed by questionnaire hence one has to be cautious about interpretation of food intakes quantitatively. [b] Inference implied by Figure 1 of the draft Report for body weight differences due to difference in reported sugar intakes would not be supported by corresponding changes in body weight. [c] Differences in body weight between higher and lower sugars intakes at 6 months were less than differences in body weight at baseline. [d] The higher sugars (reduced fat) diet lowering body weight faster than the lower sugars (reduced fat) diet.	[a] A poor quality dietary assessment would tend to cause a loss of sensitivity and mitigate against seeing the observed differences. [b] [c] [d] [e] The study did not meet the *a priori* criteria for inclusion for anthropometric outcomes. [f] SACN appreciates the respondents views on these relationships

Reference	Comment	Action agreed by SACN
	[e] For lowering body weight, advice to reduce fat intake only was more effective than advice to reduce both fat and sugar intake. [f] Overall, the evidence on sugars intake and obesity is suggestive, but evidentially it remains to be established that sugar really is more obesogenic than other major sources of energy—on average for either other carbohydrates and fats.	
Page 54 11.13	"It is recommended that for sugars]" "likely". Applicable to carbohydrates, starches, and glycaemic index and load) [a] Undue speculation exists even in the proposed recommendation. [b] There appears to be a lack of understanding of the literature. [c] The analyses undertaken have a very limited perspective on the context of carbohydrate consumption. [d] No evidence was found in the report that showed 5% sugars intake if achievable would have the impact suggested. Clearly focused, zero speculation, and evidential conclusions are needed. [e] There are three issues for which evidence exists: dental, obesity, type-2 diabetes. Primary mechanisms include acidogenesis, energy load, and glycaemic load respectively. Sugars are not unique in that starchy foods also contribute to all three. All three are conditional, efficacy or association being evident when too much carbohydrate is consumed over prolonged periods in the day when sugars (beverage and fruit juice drinks) or higher glycaemic starch (foods) are consumed. [f] Efficacy or association due to displacement of fats by carbohydrate becomes evident when the glycaemic index of the carbohydrate is above or below average. When glycaemic index is average, no effect is seen, so carbohydrates appear inert when they are not. [g] Also, replacement of detrimental fat with detrimental carbohydrate	[a][b][c] SACN is unable to comment without concrete examples where the respondent sees 'undue speculation', 'a lack of understanding' or 'a very limited perspective' in the report. [d] The report is a risk assessment. On balance SACN believes that achievement of the recommended intakes would move the population toward the impacts suggested. [e] SACN thanked the respondent for the comment, which would be in line with the evidence and recommendations in the report. [f] SACN is not clear what evidence base the respondent refers to. The respondent is referred to the relevant Report sections on GI. [g] SACN is not clear what evidence or conclusions the

Reference	Comment	Action agreed by SACN
	makes it appear that carbohydrates are without effect on (or associate with) health. [h] There is greater need to limit the claims made both to "Effect/Association" and to No effect/No association.	respondent is referring to, or where revisions are suggested. [h] SACN is unable to respond without concrete examples where the respondent believes such changes in the draft Report conclusions are warranted by the evidence.
Page 55 11.15	Definition: "Therefore it is recommended that dietary fibre should be defined as all carbohydrates that are naturally integrated components of foods and that are neither digested nor absorbed in the small intestine and has a degree of polymerisation of three or more monomeric units, plus lignin." [a] The issues below (and no doubt additional issues of others) have not been considered. Consequently the definition as recommended may be premature i.e. not yet adequately thought through and can be rejected for the time present. [b] All definitions of dietary fibre have problems, and the present one is no exception. [c] The definition excludes "synthetic components" whereas SACN 2008 did not so exclude. However, would polydextrose be excluded? [d] How would methods distinguish between inulin as an ingredient and inulin as naturally present in food. [e] Should resistant starch be considered non-natural if generated by retrogradation? [f] Should resistant starch exclude mono and disaccharides generated during transit of the upper GI tract from resistant starch as analysed in the laboratory, at present such are included in the resistant starch definition? [g] While the draft recommended definition differs from those proposed elsewhere, which new method of analysis measures an amount	[a] to [i] SACN thanked the respondent for highlighting this error. The definition of dietary fibre was intended to be in line with the Codex definition and not be limited to carbohydrates that are naturally integrated components of food; the phrase 'naturally integrated components of food' has been removed from the definition of dietary fibre. [f] SACN considered that such mono- and disaccharides should not be excluded from the definition of resistant starch. [g] SACN thanked the respondent. SACN has removed references to specific AOAC methodologies in the report

Reference	Comment	Action agreed by SACN
	limited by the recommended definition? [h] Presumably, gums (e.g. guar) would be considered as dietary fibre? [i] Would polysaccharides synthesised by bacteria (e.g xanthan) be excluded if the microorganism was not a traditional food. [j] If increased faecal bulking is a criterion for defining dietary fibre, and this supported by a relation between faecal bulking and colorectal cancer, what relation has faecal weight to colorectal cancer independently of the laxative effect of fibre? Might some laxatives be more effective? [k] What rationale exists in the draft Report for lignin being a component of fibre, no evidence is provided on relations to heart disease, stroke, type 2 diabetes or colorectal cancer? (Meanwhile perhaps lignin content is a better indicator for a better health outcome than dietary fibre itself.)	as it outside the committee's remit to advise on this. Instead the report states that dietary fibre should be measured using the prevailing AOAC methods in accordance with regulatory authorities' guidance or requirements. Newer methods for determining dietary fibre content will encapsulate all the components included in the proposed definition. [j] The role of laxatives in relation to health is beyond the scope of this report. [k] The inclusion of lignin is consistent with the CODEX definition of dietary fibre."
Page 55/56 11.19	11.19 "[A] dietary reference value for fibre of 30g per day is proposed as it is an amount which was shown in the evidence reviewed to be associated with reduced health risk". [a] This recommendation is supported by the evidence, though it is unclear how this amount related to energy intake. Had the data been adjusted to a common level of energy intake for all studies a more precise and useful value would likely have arisen. [b] Among these studies, do persons developing colorectal cancer experience increased degrees of constipation that they remedy by eating more dietary fibre in the years prior to diagnosis? What discussion in the report considers this element, which if true would not make fibre protective but indicative of higher risk only? [c] Figures 2, 3, 4, the unnumbered figure after 4, and figures 5 and 6. It is a pity that none of these figures includes the data as bubbles to show the relative positions and contributions from individual cohorts.	SACN discussed options for a fibre DRV related to energy intake, and concluded that the absolute amount DRV was more appropriate based on the evidence. The suggestion to adjust studies for (reported) energy intake does not resolve the issue, because mean energy intakes (energy requirements at energy balance) in comparable populations are broadly similar, and do not approach the range of variation in fibre intakes. Furthermore, correction for energy brings in the uncertainty of between-study variation in energy under-reporting and whether this also applies to fibre intakes. Given the types of dietary instruments that are used (especially if they are oriented to fibre) it cannot be assumed that under-reporting of both is the same. The information on whether persons developing colo-rectal experience constipation is not reported in the

Reference	Comment	Action agreed by SACN
	Not taking time to present these is somewhat lazy even if it is difficult—remember this is of national and world-wide importance. The 'dose markers' above the dose axis fail to communicate this information.	studies of dietary fibre and colo-rectal cancer risk; therefore it is not possible to comment on this. The data from the individual studies are represented by the marks on the x axis, this is not a bubble plot type of graph.
Page 56 11.19 cont.	• Interpretation of non-linearity is problematic. Is it due to uneven distribution of weights, an outcome of having first applied log transformation (important for these risk analysis) then transforming the data again as geometric means, or is it due to some interaction not identified. How much heterogeneity is removed by the cubic or polynomial that might be due to some unidentified interaction?	SACN agrees that it is difficult to be confident that the relationships are non-linear and that uncertainties remain.
Page 56 11.19 cont.	• When, earlier, data were first examined for the Institute of Medicine in about 2002 (USA), linear associations arose with minimal heterogeneity, so why now the curvature? Might it be that some studies cover a narrow range of fibre intake, so explaining curvature overall, but this may then be an artefact that hides heterogeneity. • Figures 2, 3, 4, the unnumbered figure after 4, and figures 5 and 6. Presumably the confidence intervals are for the fitted regression and not for the population of cohort values. Why do the figures not have appropriate legends. Why do we see copy-and-paste jobs rather than pastes from original computerised drawings?	The graphs come from publications as stated; the data suggest a curvi-linear relationships in most cases, though some (e.g. type 2 DM) appear linear and the CIs are for the fitted non-linear regression.
Page 56 11.20	"may have additional benefits" • The claim is ambiguous and might be taken to mean the fibre-health relations are established as due to non-digestible carbohydrate in fibre. However evidence is unclear that it is due to non-digestible carbohydrate, since, for example, dietary fibre from fruit and vegetables may not be protective in some health cases. • However reasonable the claim might seem it is speculation ("may") that	SACN considers the suggestive statement to be appropriate given the nature of the evidence, and include it to convey additional context relevant to the assessment of overall risks (benefits) of the fibre DRV.

Reference	Comment	Action agreed by SACN
	ought not to be there.	
Page 56 11.21	"no laxation trials" , "as a proportion of the adult dietary reference value" and "multiple of 5" [a] Please be specific, do you mean laxation trials or do you mean no trials of effect on faecal weight. If the latter then laxation is not meant. If laxation is meant, then please be specific about the measure, e.g. transit time or even effect on water content of faeces? [b] Please be specific 'as a proportion of the adult dietary reference value for energy' if that is what is meant. [c] Please be specific, numbers sometimes have units: 'multiple of 5 g/d'.	[a] SACN has considered the point and believe the term "laxation" to be appropriate. SACN thanked the respondent for the clarifications proposed in [b] and [c]. The report has been amended accordingly.
Page 56/57 11.22	Recommendations: Definition and limited "method 2009.01" • There was limited discussion on this in the forgoing paragraphs. The recommendation needs further consideration for reasons outline above and by wider range of stakeholders and regulators. The proposal can nevertheless be offered up for further consideration.	SACN thanked the respondent for their comments. SACN has removed references to specific AOAC methodologies in the report as it outside the committee's remit to advise on this. Instead the report states that dietary fibre should be measured using the prevailing AOAC methods in accordance with regulatory authorities' guidance or requirements. Newer methods for determining dietary fibre content will encapsulate all the components included in the proposed definition.
Page 57 11.22	Recommendation "[Dietary fibre DRV at] 30g/d" There is no discussion of whether this is applicable to both men and women. As for children, it might be pragmatic to assess different values for men and women on the basis of the relative energy DRVs. It's a pity that we have no risk data for men and women separately. Why?	The comment was noted with thanks.

Reference	Comment	Action agreed by SACN
Page 57 11.22	Recommendation Methods “2009.01” or “985.29” and “991.43” • Unclear/confusing: The first bullet point implies method 2009.01 should be used for dietary fibre analysis, meanwhile the second bullet point implies methods 985.29 and 991.43 should be used. • The draft report includes no substantive discussion on methods choice. Consequently it is inappropriate to even begin to include the analytical methods within the recommendations. • Perhaps the shortest route through this is to tabulate the methods used by each publication for the cohort studies that yielded the evidence, which is what might have been done behind the scenes, but needs to be in the Report, then simply report which were used rather than making a recommendation.	SACN thanked the respondent for their comments. SACN has removed references to specific AOAC methodologies in the report as it outside the committee’s remit to advise on this. Instead the report states that dietary fibre should be measured using the prevailing AOAC methods in accordance with regulatory authorities’ guidance or requirements. Newer methods for determining dietary fibre content will encapsulate all the components included in the proposed definition.
Page 57 11.22	“No specific recommendation is made for children aged 2.0 years and less, due to the absence of information, but a diet containing increasing amounts of whole grains, pulses, fruits and vegetables is encouraged in the context of a normal growth pattern.” • This is beyond the scope of the presented analyses. • It should instead be recommended that an experts body address this issue.	The recommendation for children aged 2 years and under is consistent with conventional nutritional recommendations for this age group.
Page 57 11.22	“Dietary fibre intake should be largely achieved from a variety of foods, such as whole grains, pulses (e.g. kidney beans, haricot beans, lentils), potatoes, vegetables and fruits, where it is a naturally integrated component.” • There is limited analysis presented for a role of fibre from the different food groups. • It is doubtful that emphasis should be placed on potato, which associated with greater levels of type 2 diabetes, and likely CHD in	SACN thanked the respondent for their comments. This text has been amended.

Reference	Comment	Action agreed by SACN
	women. • It is doubtful that fibre from fruits contributes to much of the fibre benefits for type-2 diabetes and CHD, and fibre from vegetables only a little more if any. • The report ought to be stating some of such information and only including in recommendations the information derived from the reviewed science.	
Page 58 12.2	12.2 “In accord with the SACN Framework for Evaluation of Evidence, strict inclusion and exclusion criteria were applied in the systematic reviews to ensure the evidence considered was of sufficient quality to be able to draw sound conclusions (SACN, 2012)”. • It is clearly evident that the criteria are neither strict nor adequate in regard the prospective cohort studies as is particularly evident for “carbohydrate”. Since drawing up the guidelines there is now significant additional confirmatory evidence on the adequacy of food frequency questionnaires (FFQs) and hence prospective cohort studies using them. It is evident that the use of FFQs with low correlations between carbohydrate content of food intake assessed by FFQ compared with more accurate methods yield results strongly biased towards the null. This was identified by (Brunner et al [15]), shown to matter for carbohydrates by Barclay et al [2] and confirmed and established as highly significant cause of strong bias to the null during a comprehensive dose-response meta-analysis (Livesey et al 2013[3]). The Report includes meta-analysis of prospective cohort studies without examining the sensitivity of combined outcomes to the size of the FFQ correlation. • Through not taking this issue into account, we can no longer consider the assurance given within the quoted statement extracted (above) that the draft Report has excluded studies low in quality.	The report includes discussions of the strengths and weaknesses of the data on which it is based.

Reference	Comment	Action agreed by SACN
Page 59 12.6 – 12.8	12.6-12.8 “High heterogeneity” “carbohydrate […] neither detrimental” • “Carbohydrate is not detrimental” is a statement that is very likely incorrect and can be easily abused . There is some evidence in the Report that high intakes associate with detriment. Just because these are not reached by 95% of the population in the UK does not mean the statement is true everywhere, or for everyone in the UK. Nor does the statement apply to total carbohydrate for all foods. Also it applies to diets only. Some fair caveat would be appropriate to avoid abuse of the statement. We have not to forget that replacing detrimental fat with detrimental carbohydrate can result in studies showing no effect. Evidence exists in the literature if the review team care to look for it.	SACN thanked the respondent for their comments and has amended the text in the report to read “…total carbohydrate intake appears to be neither detrimental nor beneficial to cardio-metabolic health and colo-rectal health.” However, this report also highlights that there are specific components or sources of carbohydrates which are associated with more beneficial or detrimental health effects.
Page 59 12.9	“beverages” [a] Not all sugars are sufficiently acidogenic to be cariogenic, isomaltulose is an example [18]. [b] According to the classification of carbohydrates as presented in the draft Report, polyols are sugars, and these too are not sufficiently acidogenic to be cariogenic. The solution here though is to correctly classify polyols as a category apart from sugars (and to avoid the use of the term sugar alcohol, which for lay and other persons is a highly misleading name). (see comment against para 2.1)	[a] There were very few studies which provided evidence on individual sugars. [b] SACN thanked the respondent for highlighting these errors. The section of polyols has been moved to the chapter on ‘Non-digestible oligosaccharides and resistant starch’. The term ‘sugar alcohol’ has been replaced with ‘polyol’, and a comment has been added to the glossary of terms linking polyol to sugar alcohol.
Page 59 12.12	“higher intakes of sugars” • Lazy speak? A higher percentage of dietary energy as sugars is in the figure that is reported. Please be clear about the science. • It is further unclear whether the studies did not prescribe a higher energy diet in the first place (i.e. calories versus no calories, which would	SACN thanked the respondent for their comments. The text reflects the overall conclusions from the

Reference	Comment	Action agreed by SACN
	elevate the percentage of total energy as sugar too), thus it is unclear whether sugars per se are problematic as stated. Similar studies prescribing higher energy intakes of solid foods not sugars also lead to a higher energy intakes, body weight and BMI. Some consideration of the data is needed so that appropriate caveats can be made to reflect the science and inform appropriately.	evidence. Details of specific studies supporting this conclusions are described elsewhere in the report and supplementary materials, and will not be repeated here.
Page 59 12.15	Starch and starch-rich foods • Potential exists for abuse of the statement. Starch contributes to higher glycaemic load diets which are detrimental to health in regard incident type 2 diabetes (Livesey et al, 2013[3]). An appropriate caveat is needed against the overall conclusion.	SACN thanked the respondent. The paragraph has been deleted from the report.
Page 60 12.16	Dietary fibre [a] A caveat is required because the associations found for whole grain can be due to greater amounts of dietary fibre; this especially that cereal fibre has a stronger association with incident disease than has dietary fibre from either vegetable or fruit. [b] A claim to indicate no association for dietary fibre and body weight has a reasonable probably of being incorrect: • Body weight reduction due to high fibre is of similar magnitude of effect as is body weight gain due to sugar consumption, and perhaps of greater effect on a g/g basis. Firstly, there are many studies in total that find an association or effect, and these far outweigh those finding no effect—short, medium and long term studies show consistent results. Second, intervention studies can indicate no-significant effect when too little dietary fibre has been administered. Third, fibre expands on food structure to limit intake, and limited intakes result in apparent food energy values of fibre to be lower than when energy intake is unrestricted by higher fibre. Fourth,	[a] SACN thanked the respondent for their comments. A sentence has been added to para 8.126: “Any associations indicated for whole grain may be related to its cereal fibre component.” [b] and [c] The conclusions reflect the empirical evidence judged according to *a priori* criteria.

Reference	Comment	Action agreed by SACN
	prospective cohort studies in regard energy intake are limited in precision by not being able to adjust for energy intake in the same way as for other nutrients, the results remain unadjusted and less precise and so are are biased to the null, which might partly explain the finds in this Report. Fifth, high fibre diets cannot be used in cystic fibrosis because of the difficult of administering sufficient energy for growth. Sixth, a high fibre food (gruel) is known to limit growth of the very young. [c] It would be better to avoid conclusions which are in doubt. [d] Perhaps what is meant is that body weight did not appear to confound benefits of dietary fibre found on incident disease.	[d] SACN has reviewed the text and stands by the original wording.
Page 60 12.19	"health/disease outcomes" [a] The author of this phrase might know what is meant, but it is ambiguous to the reader. It would be understood if 'incident disease' was said (an option for disease prevalence does arise as relevant studies do not feature among the studies reviewed). [b] A problem here is that the conclusions relate mainly to difficulty in the reviewers finding relevant papers. [c] A further problem is that the conclusions relate to strict criteria excluding useful data. For example, the conclusions do not speak for studies of marginally shorter duration. Inevitably the choice of study duration used in the criteria is somewhat arbitrary, (not too short and not too long, while what is too short and what is too long are issues of judgement rather than strict science).	[a] SACN thanked the respondent for their comments. The sentence has been amended to read: ... and the health/disease outcomes considered in this report. [b] The text refers to outcomes where there was sufficient evidence meeting *a priori* criteria to draw conclusions. Where evidence was insufficient, this is detailed elsewhere in the report. [c] The respondent is correct: SACN agreed *a priori* criteria and has consistently applied these (rather than allow these criteria to be shifted *post hoc* to include additional specific studies, which itself is arbitrary and open to bias).
Page 60 12.20	• There appears to be undue overlap with 12.19. • "unclear", "but", "unclear", please clarify. Be specific about why the EU	The EU authorization is a statement of fact, and SACN is not judging the value of that but simply expressing lack of clarity as to the future impact this will have (e.g. in terms

Reference	Comment	Action agreed by SACN
	authorisation is of doubtful value in combined mines of the review team. If a coherent reason is not possible, it would be preferable to not raise an undefined issue.	of contribution to fibre intakes).
Page 61 12.21	12.21 "There is no evidence from prospective cohort studies to suggest an association between glycaemic index and cardiovascular disease or coronary heart disease." • Wrong, totally wrong. • The conclusion would be stunning if it were not for knowing the review is well out of date, even then it is very highly surprising that the earlier studies were not found. • Published meta-analysis of prospective cohort studies show a strong association for CHD and glycaemic index and load in women, with no significant association in men. The lack of effect in men might be attributed to several things, possible higher levels of alcohol consumption; possibly poorer reporting on FFQs when conducted on large numbers of participants compared with smaller numbers in FFQ validation studies. • Combined studies for the mixed-sex population with dummies centred on 0 for gender has potential to retain a very significant relation between CHD and both GI and GL for the population as a whole. • Combined studies for the mixed-sex population with a sex-fraction covariate is needed for examination of population average associations. • One might in addition note that since there is a well-established association with type 2 diabetes, there is a high risk expected for CHD and GI and GL owing to CHD risk being more sensitive to perturbations in HbA1c than is the risk of type 2 diabetes.	The respondent has suggested a number of possibilities why the 'wrong' outcome might be observed, and proposed corrections that can be selectively applied *a posteriori* in the effort to draw a different conclusion. SACN stands by the conclusions, which reflect the empirical evidence for the total population judged according to *a priori* criteria.

Reference	Comment	Action agreed by SACN
Page 61 12.21 cont.	12.21 “Glycaemic load is associated with a greater risk of cardiovascular disease” • Even though there were a small number of studies captured in the search performed, there are more now. Consideration should be given to exclusion criteria, studies with inadequate FFQs should be excluded.	SACN agreed *a priori* criteria for studies and consistently applied these. The criteria for inclusion will not be re-visited post-hoc; furthermore, criteria for the (in)adequacy of FFQs would be exceedingly difficult to define and apply.
Page 61 12.21 cont.	12.21 “The available evidence does not suggest an association between glycaemic index or load and colo-rectal cancer incidence.” [a] The review is out of date. New meta-analyses are required. [b] The review took no adequate account of adequacy of FFQs, a new meta-analysis should do so. [c] The review for GI and GL should , where possible, ensure data entered is energy adjusted according to Willett’s / Stampfer and Willett’s method in the original studies, and importantly, too, across the studies towards a common energy intake, e.g. 2000kcal	[a] The report clearly states the cut-off dates for the systematic reviews and update search. [b] Criteria for the (in)adequacy of FFQs would be exceedingly difficult to define and apply. [c] From above: The suggestion to adjust studies for (reported) energy intake does not resolve the issue, because mean energy intakes (energy requirements at energy balance) in comparable populations are broadly similar, and do not approach the range of variation in GI/GL intakes. Furthermore, correction for energy brings in the uncertainty of between-study variation in energy under-reporting and whether this also applies to GI/GL intakes. Given the types of dietary instruments that are used it cannot be assumed that under-reporting of both is the same.
Page 61-62 12.23	[a] What is given is unnecessary reporting bias. [b] For diets, GI and GL inform about a domain that associated with risk/benefits that are not accessed by the other carbohydrate components reviewed in the draft Report. It is not intended that GI or GL be used alone as the indicator of a healthful diet (as often seems to be wrongly implied elsewhere), rather GI and GL is applied within the context of what is deemed healthy food-based advice. It should be further recognised that healthy food-based advice is not optimal for	[a] [b] [c] SACN agreed *a priori* criteria for studies and consistently applied these to these sections just as other sections of the report. It is not clear from these comments what alternative process SACN should have followed in drawing or expressing conclusions.

Reference	Comment	Action agreed by SACN
	identifying higher versus low GI or GL foods, despite the occasional opinion claiming that it does so (analysis shows the contrary). [c] The bias expressed in the report would limits a consumer's ability to identify an optimum diet, prevent appropriate dietary choice (as well as free choice), and unduly worry many type 2 diabetes patients and others world-wide who apply GI and GL by choice to benefit their own condition.	
Page 62 12.24	"carbohydrate, glycaemic index, and glycaemic load" It is unclear why there is such negativity focused particularly on carbohydrate, glycaemic index, and glycaemic load. The same negatives apply to dietary fibre intake, whole grain intake and added sugars intake, all of which are imprecise measures and can be accompanied by varied intakes of other micro- and macronutrients and phytochemicals. There is little or no consideration of this problem in the draft Report. Thus there seems to be a possibility of author bias and speculation. Not mentioned is that a major downfall of intervention studies is that long-term studies tend towards convergence of treatments and controls. Not mentioned another major problem with the consideration of intervention studies and their meta-analyses, is that it is often not stipulated whether the analysis is for a rate of change over a defined period or for a new steady state. Overall the draft Report reports negatively rather than on balance. There are few statements of advantages. For example, population based studies concern relevant doses, while intervention studies may not do so. In contrast, intakes of particular nutrients (or nutritional attributes) may be uniform across the population, making the range of intakes too small to find a significant association. Further, the range of nutrient intakes (or attributes) in any particular country may be too low or too high compared with an optimal intake, so	The respondent has suggested a number of possibilities why the 'wrong' outcome might be observed, and proposed corrections that can be selectively applied *a posteriori* in the effort to draw a different conclusion. SACN stands by the conclusions, which reflect the empirical evidence for the total population judged according to *a priori* criteria. SACN agreed *a priori* criteria for studies and consistently applied these. The criteria for inclusion will not be re-visited post-hoc; furthermore, criteria for the (in)adequacy of FFQs would be exceedingly difficult to define and apply.

Reference	Comment	Action agreed by SACN
	that 1SD change within a country might underrepresent importance of larger differences worldwide.	
Page 62 12.24 – 12.27	The section repeats a great deal of what has already be stated in earlier sections. This section and perhaps the report as a whole should be cut in length to 50% its current size and restructured to give far better focus. The recommendation on dietary fibre definition needs wider consideration at a regulatory level. There is an absence of data and discussion on the gastrointestinal discomfort arising from the consumption of more dietary fibre. There is an absence of data and discussion on the prevention and relief from constipation with higher fibre food (fruits, vegetables and whole grains), and especially in pregnancy, post-partum, and older adults. Particular types of whole grain products may cause constipation. Optimum cereal forms for easing constipation may not be whole grain. Recommendation of potatoes as a good source of fibre is problematic because of the risk of type 2 diabetes.	These paragraphs state the report's recommendations, making it necessary to repeat some of what has been stated earlier in the report. Regulatory matters are outside SACN's remit. SACN has removed references to specific AOAC methodologies in the report as it outside the committee's remit to advise on this. The report states that "Evidence on adverse effects of very high intakes of specific carbohydrates, e.g. gastrointestinal symptoms, was not part of the remit of this report." and "Adverse effects on gastrointestinal symptoms such as bloating, borborygmi or flatulence, have not been considered." These sections are stating SACN's recommendations. They are not communicating the underlying evidence base for these or cataloguing the evidence relating to specific food sources, both of which are detailed and summarized elsewhere in the report. The text related to dietary fibre intake has been amended.
Page 63 12.32	• 12.32 The recommended dietary patterns were not investigated or not reported in the draft Report. It would be appropriate to set up an appropriate studies and review.	SACN believes the statement is an appropriate translation of the evidence into general food patterns to achieve the DRVs and beneficial effects of specific components and foods sources as identified in the report.
Page 63 12.33	• 12.33 the definitions "low" and "high" have particular meanings in food regulations, such that the recommendations here would not make sense.	SACN thanked the respondent. The report has been amended to state 'lower' and 'higher' rather than 'high'

Reference	Comment	Action agreed by SACN
	What would seem acceptable is to say ‘lower’ and ‘higher’.	and ‘low’.
Page 63 12.24 – 12.27 cont.	Women in pregnancy deserve advice too, pregnancy is excluded but in due course there needs to be some explanation of where/what they should turn to for advice and some future commitment to review foods and diets in pregnancy. All too frequently, GI and GL attract negative comment because commentators think the scientific community present these concepts as primary health measures. They are wrong. GI and GL are one of several attributes of foods (and diets) that impact on health. In general, food-based advice has primary position, only within food groups is a GI or GL measure selected. No food-based advice (and no compositional based advice) has been devised to select an optimal diet since all food-based advice and compositional-based advice can result in food selections of only high or only low GI as well as only moderate GI overall and so also optimal and suboptimal GL. For the perceivable future, only when GI or GL is used with an appropriately healthy food-based selection process can optimal diets be obtained. Omitting GI and GL from choices of healthy nutritional advice is further suboptimal. Individuals choose their preferred approach to organising their diets. Unduly ignoring an important option limits the potential success of health measures in total. It is an uncomfortable to consider the UK continues to not recognise that the quality of fatty foods and quality of carbohydrate foods matter more than is evident among the UK’s health messages, food labels and food tables, most especially that the quantities of fat and carbohydrate together has proved difficult to control in the UK and other world regions.	A supplementary review of carbohydrate intake during pregnancy in relation to birth weight and cardio-metabolic health outcomes was conducted and is reported in Annex 7. Higher and lower glycaemic index or load diets will, in most cases, differ in many ways other than just the carbohydrate fraction. SACN considers that it is not possible to assign cause-effect relationships for outcomes based on variation in diet glycaemic index or load, as the nature of the intervention includes a number of factors. Therefore, the findings on GI and GL have not been reflected in the dietary carbohydrate recommendations in this report.

Reference	Comment	Action agreed by SACN
A3.1	"HFCS, also known as isoglucose" • It might well be "also known", but then HFCS would be wrongly known as isogucose. The two products are prepared differently. Moreover HFCS can have different proportions of glucose and fructose (from 45 to 90% fructose, though the latter is less common than 45 and 55% fructose versions) . By contrast, a G:F ratio of 1:1 is expected for isoglucose. • The paragraph is overlong with inaccuracies.	SACN thanked the respondent for highlighting this error. The text has been amended and now states "(HFCS, an example of a number of different glucose/fructose mixes with ≈40-60% fructose content)…"
Page 64 A3.3	The paragraph does not represent the wealth of published narrative and meta-analytical reviews on fructose (Livesey 2014 [17], Livesey 2010[16], Livesey 2009 [19], Livesey 2008 [20], Sievenpiper's group 2011-1012 [21-27]. Very long-term studies are needed, but need to account for seasonable variables, carbohydrate load, glycaemic index, energy intake (as appropriate).	The text in this annex has been amended to add detail from the following refs: Livesey G & Taylor R (2008) Fructose consumption and consequences for glycation, plasma triacylglycerol, and body weight: meta-analyses and meta-regression models of intervention studies. The American Journal of Clinical Nutrition 88, 1419-1437. Sievenpiper JL, Chiavaroli L, de Souza RJ, et al. (2012) 'Catalytic' doses of fructose may benefit glycaemic control without harming cardiometabolic risk factors: a small meta-analysis of randomised controlled feeding trials. Br J Nutr 108, 418-423. Information from the other papers the respondent cites have not been included because: *Ref 16 is a short narrative referring to data on sugar-sweetened beverages rather than fructose per se* *Ref 17 is a narrative review (and was published too late to be considered in the draft report)* *Ref 19 largely re-presents the conclusions from ref 20* *Ref 21 refers specifically to studies in diabetics subjects, so outside the scope of the report*

Reference	Comment	Action agreed by SACN
		Refs 23/24 are short commentaries/letters *Refs 25 and 26 are identical, and this paper has been cited in the report* *Ref 27 is on glycaemic responses , not specific to fructose*
Page 64 A3.6	"Fructose" "There is only one trial" "men" only "The body absorbs free fructose and glucose, or the same sugars derived from sucrose and HFCS, in exactly the same way" • Overall the review of the literature on fructose is weak and misses important narrative and meta-analytical reviews. There is a high risk of reporting bias. • "Fructose" is also used in foods added as pure (solution, syrup or crystalline) fructose in drinks, these among appearances of sucrose, HFCS, isoglucose and variable mixtures in fruit juices. • "in exactly the same way". This misses some important point! • It can be recommended that the review is updated, and that the range of viewpoints on fructose is strictly kept in balance.	SACN thanked the respondent for these comments. The text has been amended to read: "However, with the exception of certain fruit juices, glucose and fructose are not commonly consumed in large amounts independent of each other within the normal diet. Instead they are primarily consumed as components of sucrose or high fructose corn syrups (or honey or other commercial glucose/fructose mixes). Sucrose consists of 50% glucose and 50% fructose and honey and most HFCS and other commercial syrups contains glucose and fructose in ratios broadly similar to sucrose. The body absorbs free fructose and glucose, or the same sugars derived from sucrose and HFCS, in exactly the same way. Therefore it appears unlikely that fructose, as consumed as a component of most HFCS or other glucose-fructose syrups,…"
Page 64 A3.8	"insufficient evidence" • Because there is a larger literature than admitted in this review, it might be perceived that the review did not look sufficiently broadly at the available evidence. It would be improper to hide behind the criteria for study selection for substances with potential adverse effect.	It would be inappropriate to change criteria which were set *a priori* and used throughout the report. SACN stands by the conclusion.
Page 64 A4.35 & A4.38	"15 days" study. "pH 3.1" • There are many studies of 15 days and longer for other health effects and carbohydrates not mentioned in the review. Reason for including one at this point for a specific product type suggests inconsistency in the systematic approach to the review, albeit in the appendix.	These studies were in relation to tooth wear where few data are available. The evidence is weak but they were included in the review to demonstrate how little evidence there was.

Reference	Comment	Action agreed by SACN
	• Some other studies mentioned may also not meet the inclusion/exclusion criteria. Too little information is provided in the draft report for the reader to know without checking the original publications. In other words, the review is not self-supporting, which raise an issue about transparency.	
Page 64 A4.1 to A4.45	All Dental Health sections. • There is a great deal of published information on polyols and dental health. It would help to begin the Report with what is known and what is not known, and whether a not know needs to be known.	Polyols are included in the report because studies have looked at them in terms of artificial sweetening agents and so a method for reducing sugars consumption rather than as a carbohydrate source. The report is not a review of strategies for reducing caries it is about evidence for the effects of sugars on oral health.
Page 74 Note 5	The need for long-term studies in assessing the risk of caries when using sugar replaces is especially doubtful. The role of acidogenesis and plaque formation in caries development particularly from sucrose is well established, yet the draft Report makes no reference to the use of polyols as sugar replacers to reduce the risk of caries development. Meanwhile there are multiple assessments of risk by way of metabolic markers for cardiovascular disease yet the predictive value of the vast majority of such markers is low and sometimes doubtful. Meanwhile markers of caries risk have very high predictive value and include the following, which are missing from the draft Report: • Evidence of insufficient oral acidogenesis in humans studies from polyols alone compared with sucrose as a positive control. • Reduced substrate for dental plaque formation in humans from polyols alone compared with sucrose as a positive control.	Some of the evidence comes from studies that have looked at polyols as sugars replacement. Caries was the outcome measure we were assessing not potential surrogate markers for caries like acidogenesis.