Paper for information: Responses to the energy requirements report consultation and actions taken

Agenda item: 2

Please see attached paper for information.

This document has been prepared for consideration by the Scientific Advisory Committee on Nutrition. It does not necessarily represent the final views of the Group or the policy of Health Departments and the Food Standards Agency.

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SUMMARY OF RESPONSES RECEIVED FROM SCIENTIFIC CONSULTATION ON THE ENERGY REQUIREMENTS DRAFT SACN REPORT.

Procedure

The Energy Requirements working group wrote to interested parties on the 5 November 2009 to alert them that the draft report on Energy Requirements had been placed on their website. Comments on the science of the report were requested to be submitted by 11 February 2010.

Response

11 responses were received and are available, in full on the SACN website.

Responses were received from the following organisations and individuals:

1. British Dietetics Association (BDA)
2. British Nutrition Foundation (BNF)
3. Forsum, Professor Elisabet, Linköping University, Sweden
4. Henry, Professor Jeya, Oxford Brookes University
5. Ki Performance (Consultants) Limited
6. Medical Research Council Human Nutrition Research (MRC-HNR), Cambridge
7. Public Health Nutrition Research Group, University of Aberdeen
8. *Safe*food
9. School Food Trust
10. Sugar Bureau
11. Winkler, Professor JT, London Metropolitan University

Please note that paragraph, table and appendix numberings refer to the Draft Energy Requirements Report published for consultation in November 2009.

Table 1- Overview of responses received to the Energy Requirements draft report

	Comments	Organisation/ Individual	Action agreed by Working Group
General comments in support of report	Welcome the new draft guidelines for energy and congratulates the Scientific Advisory Group on the vast amount of work to review and summarise the literature relating to energy expenditure and requirements.	BDA	SACN thanked responders for their positive comments.
	Agree with the use of measured values of total energy expenditure wherever possible to replace the use of PAL values based on the time allocation of different activities and the PAR of each activity. Welcome the replacement of the Schofield prediction equations with the prediction equations of Henry, as Henry's equations represent the largest and most rigorously tested equations. Note that the height and weight equations were used to derive EARs for adults.	BDA	
	Agree with the evidence presented that prediction of PAL cannot be done with the accuracy previously assumed for population groups but a variable physical activity factor is required to derive energy requirements for adults. Note that despite the criticisms levelled at the BMR x PAL approach, no satisfactory alternative has been identified	BDA	
	Consider the draft report on energy requirements to be well written and based on sound science. On the whole, agree with the scientific approaches taken to reassess population energy requirements. Agree that it is appropriate to estimate requirements based on measures of energy expenditure rather than energy intake. The development in the use of the doubly labelled water (DLW) technique to measure energy expenditure objectively is considered to be significant. It is deemed important that DLW measures all components of energy expenditure, including spontaneous physical activity, and is not subject to the limitations of lifestyle questionnaires and factorial estimations. The DLW technique is not without limitations, and these limitations have been recognised in the draft report. However, DLW is considered is the best measure of total energy expenditure we have at the moment.	BNF	
	Consider the report to be a detailed and comprehensive review of the scientific basis for determining requirements.	MRC-HNR	
	It is encouraging that there are improvements made from the 1991 COMA recommendations with the approaches used in the SACN draft report which are more evidence based and more accurate than the 1991 recommendations.	Ki Performance (Consultants) Limited	

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	Agree with the use of DLW measurements of TEE wherever possible and the avoidance of the use of PAL values based on the time allocation of different activities and the PAR of each activity.	Public Health Nutrition Research Group, University of Aberdeen	
	It is clear the Advisory Committee has incorporated the latest available data into their derivation.	*Safe*food	
	Respondent states that this technical report provides a comprehensive review of the current understanding of the factors which characterise optimal energy intakes for attaining energy balance at the population level and for significant population sub groups including infants, children and young people, adults and the elderly and for periods of increased energy requirements such as pregnancy and lactation. This report is timely insofar as it succeeds the FAO/WHO/UNU Human Energy Requirements (2004) and the Institute of Medicine Dietary Reference Intakes (2005) reports and incorporates advances in the measurement of energy expenditure, understanding of the contribution of physical activity levels and basal metabolic rate to energy expenditure, a broader base of information from which to estimate BMR, refined prediction equations for BMR and greater understanding of the epidemiology of diet (sub-optimal energy) related disease. Furthermore, by the time this consultation is complete the previous COMA review will have been in use for a 20 year period which has seen considerable change to the diet, physical activity levels and health status of the UK population.	School Food Trust	
	The respondent believes that the draft report “represents the most comprehensive, erudite & detailed analysis of energy requirements ever published. It sets a new bench mark in the estimation of energy requirements. The committee is to be congratulated for its lucid presentation, of what is really a complex subject. It is written in a highly readable style. More importantly, whilst detailed in scientific content, its text is highly accessible to non-scientists. The report is based on the most up-to-date sciences of basal metabolic rate, physical activity, diet induced thermogenesis and the energy cost of growth. It has built on the progress made by earlier reports such as the FAO/WHO/UNU report & the IOM (USA) on energy requirements. It has developed an excellent model for the estimation of energy requirements in infancy, children, adults, and in pregnancy and lactation. Most	Professor Jeya Henry	

	uniquely, the theoretical calculations have been validated against real life data extracted from OPEN/ Beltsville. The Appendix describes the rationale behind the calculations making it the FIRST EVIDENCE BASED DOCUMENT. The reference list is the best that I have seen. Here is a document that is setting a new benchmark in the estimation of energy requirements. It is going to be the leader in the field.		
General comments in criticism of report	Consider it important that the report is clear, throughout on whether or not a statement refers to *exclusively* breastfed infants. Agree that the available data best allows for estimated average requirements (EARs) to be developed separately for breastfed and non-breastfed infants.	BNF	Noted and agreed.
	Think that although efforts have been made to structure the report with sub-headings, and to make full use of appendices, there is probably still scope to move some aspects out of the main report to improve the accessibility of the document.	MRC-HNR	Noted and agreed. Report will be edited and where appropriate, detail moved to the appendices (for example, paragraphs 85-97 on obesity moved to Appendix 7).
	Note that on multiple occasions the report emphasises the need to increase physical activity. While entirely supporting this important public health message, the respondent believes that it distracts from this report and does not sit comfortably with the overall message that population energy requirements are greater than previously estimated because the energy needs for physical activity were previously underestimated. Thinks that the physical activity message should be kept separate or phrased more precisely, perhaps as part of a wider consideration of energy recommendations.		Noted.
	Highlight the implication that higher EARs for adults suggest that under-reporting in the NDNS surveys is greater than previously believed, which could undermine the confidence in this data.	Public Health Nutrition Research Group, University of Aberdeen	Noted.

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Table 2- Specific comments by chapter/appendix

Chapter/appendix	Comments	Organisation/ Individual	Actions agreed by working group
Introduction	Para 13: Respondent supports use of the median to describe the midpoint of the distribution of energy requirements.	MRC-HNR	Noted.
	Thinks that para 15 should make clear that EI is only equal to EE for populations in energy balance.		Agreed. Text amended to address this.
	Believes that para 49 should make clear that the method described is the method used in the UK. The USA for example, measures carbohydrate by difference and hence estimates of EI are consistently lower than estimated using a UK food database. This has implications for comparing levels of under-reporting of energy intake across the two countries which are not widely appreciated.		Text inserted to address this.
	Respondent thinks paras 90 and 91 should be updated with the latest data from Health Survey for England.		Done using: http://www.ic.nhs.uk/webfiles/publications/HSE/HSE08/Volume_1_Physical_activity_and_fitness_revised.pdf
	Para 100: Respondent recently submitted a systematic review on the relationship between physical activity and the risk of excess weight gain in children, using only data from objective measures of physical activity. The review found no evidence of any association. We would be happy to provide a copy of this paper if desired. (Wilks DC, Besson H, Lindroos AK, Ekelund U. Objectively measured physical activity and obesity prevention in children, adolescents and adults: a systematic review of prospective studies. Submitted to Obesity Reviews.		Agree to include reference to this review.
	Para 101: Believes that the methodology used to assess energy intake in NDNS is considerably more robust than the EFS, but still suffers from under-reporting and there is indirect evidence of a secular trend towards increasing under-reporting over time. (Rennie KL, Jebb SA, Wright A & Coward WA (2005) Secular trends in under-reporting in young people. Br J Nutr 93; 241-247).		Agree.
Approach used	Agree that it is preferable to predict total energy expenditure (TEE) from measured	BNF	Noted.

to derive energy reference values	physical activity levels (PAL) rather than with regression equations, largely because this method takes better account of between individual variation in physical activity energy expenditure (PAEE).		
	Pregnancy requirements : Page 45 – feel SACN's recommendations regarding extra energy required for pregnancy are too low. SACN recommends 0.8 MJ/d (191 kcal/d) during the last two trimesters. This corresponds to a total of about 149 MJ for a pregnancy. This is less than the physiological energy cost of a complete pregnancy (321 MJ) according to the calculation by FAO 2004.	Professor Elisabet Forsum	Whether an additional recommendation should be made for energy requirements during pregnancy has been deliberated at length. This has covered concerns that recommending increased energy intake which does not allow for individual variation in energy expenditure during pregnancy, will result in a recommendation which for at least 50% of the population will encourage net fat gain and fat retention. The minutes of the 12th meeting (3 April 2009) should be referred to. Members concluded that given the limited evidence-base, existing reference values for pregnancy and lactation are reasonable and should remain unchanged.
	Point to Para 162 which notes that women are unlikely to require extra energy in the first trimester of pregnancy and that compensatory changes in expenditure in subsequent stages "mean that increased energy intake is not necessary". Think that it is therefore not clear why the Committee should continue to support an additional 0.8MJ/d which was a prudent recommendation by COMA.	MRC-HNR	
	Believe it is not clear why energy requirements during lactation should be averaged over 5 months. Firstly, the energy requirements in the early stages of lactation, when less milk is produced, will be lower and secondly, since most women do not breast feed for 5 months, the energy requirements will be a prescription for overconsumption for many women who breast fed for shorter durations. Respondent believes that there is a strong case for setting energy requirements in 2 or 3 monthly intervals through the course of lactation and extending this to at least 6 months to support the WHO recommendations on 6 months exclusive breastfeeding and also adopted by DH for the UK in 2009.	MRC-HNR	Note that a) recommendations are for 6 months (see paras 170 and 184). b) values recommended are already lower than FAO/WHO (ie 1.4 cf 2.1Mj/d) so there is probably no need for any further reduction for the first 2-3 months.
	Para 177: Suggests that paragraph should make clear that the representativeness of the population studied is a far greater cause for concern in the setting of energy requirements than the assumptions of the DLW method. It is not helpful for the wider		Text amended to address this concern.

	credibility of the report to cast unnecessary doubt on the DLW method.		
	Respondent expresses surprise that the use of a regression analysis using TEE, age, height and weight for comparison with the PAL approach has not been carried out. The argument that only the latter takes into account variability in PAEE is not clear to the respondent: the method used to define energy requirements for less or more active adults is based on the distribution of the individual values (25th and 75th centiles) and therefore it appears to the repondent that this distribution-based approach could also be applied to the residuals of the regression of TEE on age, height and weight (ideally with males and females separately to check the finding from the PAL analysis that there was no difference between TEE/BMR for men and women). The former approach avoids the use of BMR measurements or predictions, so has an advantage of simplicity. If the comparison of the two methods produced similar results this would increase confidence in the higher values. A good example of using different approaches is shown in Speakman and Westerterp, IJO 2008.	Public Health Nutrition Research Group, University of Aberdeen	The use of residuals in place of PAL values/factorial approach was discussed. It was agreed that residuals cannot be used when using predicted BMR because other variables/variation that might be contributing to BMR cannot be adequately accounted for. It was felt that there was no basis for using residuals in place of the factorial method (i.e. the 2 are equivalent), unless BMR had been measured
	The respondent also wondered whether the analysis could be carried out on all adult DLW datasets as opposed to two (albeit very large) studies.		The totality of the DLW data is not representative, as discussed in the report (paragraph 245).
	Welcome the use of the new WHO growth standards for children to 4 years, the UK 1990 reference data and a BMI of 22.5 as reference body weight		Noted.
	The respondent notes that figure 2 (p36) suggests that PAL values for children increase gradually with age up to about age 12. The respondent is not clear why regression has not been used here to develop more smoothed values for each age as there is a large dataset.		Reference added and text amended accordingly.
	Also, it is stated in paragraph 117 that the UK 1990 reference weights have been used but it is not clear which centile has been used: is it the 50th? Appendix 3 is referred to but does not provide this information.		Confirm that it is the 50th centile.

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	SACN has acknowledged concerns around the assumptions underpinning the DLW method and the prediction of BMR values, which are key aspects of the methodology used to derive the estimates.	*Safe*food	
	The respondent notes the report's discussion of the equivocal evidence on the relative roles of total energy intake and physical activity on population increases in overweight and obesity. A recent publication by Swinburn et al,[reference below] which has not been cited in the report, sought to identify the relative contributions of TEI and PA on weight gain over the last three decades. Of interest to the debate on revising energy requirements is the observation that a small energy imbalance gap between TEE and TEI on a given day at the population level is associated with a much greater Energy Flux Gap (the difference between TEI and TEE associated with higher weight) over time. This is associated with a higher TEE settling point and therefore higher energy requirement at the later time point due to greater fat mass and fat free mass. The respondent asks, if in a population of >60% obesity it is therefore possible that part of the greater TEE observed since the 1991 COMA report and hence greater EARs recommended to achieve energy balance may be a consequence of the higher obesity prevalence. **Reference** Swinburn B, Sacks G, Lo SK, Westerterp KR, Rush E, et al. Estimating the changes in energy flux that characterize the rise in obesity prevalence. Am J Clin Nutr 2009; 89: 1723-8.	School Food Trust	The literature on energy flux was discussed. The Working Group considered the introduction of new terminology was potentially confusing and therefore agreed to continue using existing terms.
	The respondent makes an argument that EARs are set to high and should be set at a level suitable to facilitate weight reduction in an overweight population: SACN is not defining eternal energy requirements for the human animal. It is seeking, quite properly, to set EARs for UK population groups in the 21st century. Hence, it takes into account the current patterns of weight and activity in setting those EARs. SACN also recognises (Para 96) "Obesity increases the risk for a number of diseases….". Among them, it lists the major causes of morbidity and mortality in British society at present, plus a variety of other problems, including impaired reproduction. These greater risks are quantified in Table 4. In the 21st century context, therefore, it would be beneficial for the health of the	Professor J T Winkler	Noted and text revised.

	majority of the adult population to lose weight. But SACN only considers contemporary distributions of weight and activity in terms of their effects on PAL and BMR. It does not take account of the current public health context in framing its EAR. It is concerned only with the balancing of energy intake and energy expenditure to maintain weight, not with the health gains that would accrue from reducing weight. It seeks to stabilise obesity, rather than reduce it. This narrow focus, this failure to attend to public health, results an EAR that is "higher…for all adults by up to 16%" (Para 199). Thus, SACN ends up in the prima facie perverse position of stating that the adult population requires more energy when the majority already weigh too much. SACN recognises this problem and attempts to explain it away in two paragraphs at the end of its report (205 and 207). The defence is to protest good intentions: people might well think that, but that is not what we meant. But SACN painted itself into this corner. The apologia is only necessary because SACN defined its role so narrowly and neglected the public health context in which its report would be made. Again, the practical result is that the DRV for adults is higher than is appropriate for the UK in the current context.		
Energy reference values	Think that in order to put the new EARs for children/adolescents and adults in context, it would be useful to know the physical activity behaviours of the reference populations used to calculate the PALs (for example what proportion of the OPEN and Beltsville US study populations meet the UK recommendations for at least 5X30 minutes of moderate intensity physical activity per week). Think it may be useful to take a closer look at the energy requirements of older adults to see if any further advice is warranted. A number of interesting studies have been highlighted in the report regarding energy reference values for older adults (paragraphs 137-139). These results raise the question of applicability of assuming energy requirements of older people are similar to those of younger people as long as	BNF	The physical activity behaviours of the reference populations are not known and text has been added to the relevant paragraph to state this. For older people who are not in good general health, there will be constraints on how much they can eat regardless of what the recommendations are. Text

	general health and mobility are maintained (this approach has clearly been adopted because of the absence of a reference population for older people). With an ageing population, it is clear that general health and mobility are not maintained for a substantial proportion of the older population and so the many older people who are not in good general health are lacking in guidance.		amended to reflect this.
	Believes that para 180 **[DN: current paragraph 168]** does not make it clear why the height and weight of the 'reference' population has been taken from NDNS. The HSE would provide a larger and more up to date, reference population.	MRC-HNR	Noted and text amended.
	Thinks that para 181 **[DN: current paragraph 169]** might need to be rephrased as Tables 16 **[DN: 12]** and 17 **[DN: 13]** do not give energy requirements for the UK population, as they are based on a hypothetical population of similar height but with a median BMI of 22.5.		Text amended to take this into account.
Summary and conclusions	It is thought that the arrows depicted in figure 4 (p.60) are somewhat confusing and it is not clear what message they are intended to achieve. It may be useful to know whether an 'average' person with a PAL of 1.63 meets the UK recommendations for physical activity but these arrows do not tell us this. In order to put the skewed distribution in context, it may be useful to present the physical activity behaviour of the reference populations here (e.g. the proportion of the OPEN and Beltsville US study populations engaged in 5X30 minutes of moderate intensity physical activity per week). Furthermore, paragraph 207 refers to the average EAR of 1.63 as being indicative of a population that is not meeting current UK recommendations. If this is the case, it would be useful to clarify this point here as well.	BNF	Amendments made to the figure to help clarify this.
	Notes that the report expresses concerns that the energy expenditure measured in the NDNS may not be representative. The respondent says that they have looked into this issue carefully and refer the Committee to the documentation discussed with Alison Tedstone as part of the review of the NDNS data. To summarise, in retrospect it is apparent that the subjects who received DLW in the 1997 adult NDNS survey were heavier than the average for all participants and heavier than reported in the Health Survey for England, especially for men. Accordingly, measured EE is likely to have been higher than typical for the population at large. The respondent can find no evidence that a similar situation has arisen in year 1 of the new rolling programme and the sampling strategy should help to minimise the chances of this occurring in year 3 when DLW measurements will be made again.	MRC-HNR	Point noted and under consideration.

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	Thinks that the strength of the NDNS is the national sampling frame, which gives far greater chance of measuring a representative population than is likely in the two USA datasets on which the adult energy requirements are based. The respondent would like to encourage the Committee to reconsider their recommendations in the light of the data from the NDNS rolling programme and, given the importance of this issue, to consider waiting for the year 3 data to become available, when the sample size will approach the numbers available from the USA datasets. The use of a UK sample, broadly representative of the population, would provide a far more appropriate basis for estimating UK energy requirements, than is possible from the USA datasets. Proposes that para 194 **[DN: 184]** needs to more explicitly refer to the "adults who took part in the 1997 NDNS sub-study" rather than imply a more generalised and widespread issue with the representativeness of the NDNS datasets. Para 202**[DN: now paragraph195]**: Respond believes that it is incorrect to state that "individual appetite generally helps match intakes with expenditure" since the increasing weight of the population implies that at a population level, appetite tends to exceed intake. Thinks that in para 205 it might be useful to emphasise that actual energy intakes are in excess of energy requirements" to distinguish from reported energy intakes. Is unclear about the meaning of the phrase "a balanced diet" in para 206.		Text amended to reflect this concern. This point has been made earlier in the text (paragraph 13). What is meant here is that individuals do not calculate how much energy they should eat. Text has undergone considerable amendment post-consultation. Text has undergone considerable amendment post-consultation.
Appendix 1. Doubly labelled water technique	Suggest that further research is needed to clarify whether the 'healthy volunteer effect' is a major issue for DLW studies. Consider it unfortunate that widescale data on TEE using DLW is not available for UK adults, but believe the OPEN and Beltsville US study populations to offer the best available data at the moment. Consider it important to address the gap in research regarding DLW studies in a UK population, as a question remains about the applicability of the US data for the UK population. See it as important to highlight this as an area for future research. It would be useful to add The International Atomic Energy Agency (IAEA) recommendations regarding appropriate quality control in studies with the DLW-method to this section. The recommendations were recently published in a handbook	BNF Professor Elisabet Forsum	Agree with this suggestion. Agree. Text and reference added to address this.

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	entitled 'Assessment of body composition and energy expenditure in humans using stable isotope techniques'.		
Appendix 2. The physical activity level (PAL) and its use in the prediction of energy requirements	The Trust notes the report's discussion of the rationale for using the distribution of Physical Activity Level (PAL) values within each population subgroup (adults versus children and young people) to provide indicative energy requirements for below average, average and above average physical activity levels (based upon quartiles of the observed distribution of PAL). The respondent thinks, it would be of use practically to have some indication of what this means, notwithstanding the authors objections to using discrete PAL values in the determination of EARs.	School Food Trust	General descriptors of sedentary, low and moderate activity are now included.
Appendix 3. BMR prediction equations	The respondent believes that, one possible reason for the higher PAL values than in the COMA 1991 report is that BMR per kg body weight has decreased due to an increased proportion of fat relative to fat-free mass in an increasingly sedentary population, so RMR equations based on body weight from leaner subjects would overestimate RMR of contemporary populations. The respondent asks if there have been recent tests of the accuracy of the Henry or Schofield equations in the UK population?	Public Health Nutrition Research Group, University of Aberdeen	This is discussed in Appendix 4, paragraph 302 "The validity of all published predictive equations for resting energy expenditure was tested in US and Dutch overweight and obese adults aged 18-65 years". Text has been added to paragraph 304. It is also an unlikely explanation since: a) the lower COMA values reflects their deliberate use of a very low PAL value of 1.4 which was not sufficiently justified b). for the two US adult cohorts used by SACN, the PAL values for the Beltsville cohort derive from measured BMR values and when we calculate BMR for the OPEN cohort to predict PAL the distribution and magnitude of PAL values in the two cohorts are virtually identical (see table 39). Text added to Appendix 11

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			(paragraph 545).
Appendix 5. Physical activity and weight	The respondent quotes a number of extracts from the report in which the limitations of DLW are discussed, e.g. because of the healthy volunteer effect. Quotes further extracts in which the lack of, or the need for UK population based data on physical activity levels is highlighted. Respondent recommends his company's Ki multi-sensor armband as a suitable "method to accurately assess and measure the physical activity levels for the UK population across different demographics including varying age groups and so we are able to accurately deduce, validate and confirm the EAR for adults".	Ki Performance (Consultants) Limited	Concern noted, however, endorsing specific products is not for this Committee.
Appendix 6. Energy requirements for illness	The Parenteral and Enteral Nutrition Group (PENG), a specialist group of the BDA produces guidelines on estimating nutritional requirements in adults[1]. These guidelines are designed for dietitians working with patients who require artificial nutritional support. Since 2005 PENG have intended to modify their guidelines on estimating energy requirements (in particular to change from use of Schofield to Oxford) equations) but have awaited the publication of the SACN Energy Report to ensure that their recommendations do not contradict. Agree that in many cases the TEE of a sick acutely ill patient or an immobile community patient fed exclusively via a tube, may be similar to that of a healthy individual and so could be predicted by EAR, but note that there are exceptions. Equally, in the acutely ill patient, because timing of appropriate nutritional support is crucial to avoid metabolic complications or delay recovery there is a role for estimating requirements on an individual basis using a different approach to that of SACN, whose guidelines apply to groups of healthy people.	BDA Parenteral and Enteral Nutrition Group (PENG)	Advice sought. No change will be made to this report.
Appendix 7. Dietary determinants of energy intake and weight	The respondent makes the following comment regarding Section 454 and Section 490: In considering the evidence from surveys of energy intake and diet macronutrient composition it is worth noting that although over the past 20 years there has been an overall increase in total energy intake from carbohydrates, this may be due to a reduction in total energy intake from fat. When looking at data from children's surveys, (NDNS and Department of Health) absolute carbohydrate intakes have actually decreased by 10g/d between 1983 and 1997 (Gibson, in press). While the amount of energy intake from carbohydrates may have increased over the same time period as an increase in the prevalence of overweight and obesity, evidence suggests there has also been reduced physical activity levels over time. A	Sugar Bureau	Comments noted. Most of the points raised are outside the remit of this Committee and have been passed to the Working Group on Carbohydrates for consideration.

[1] Todorovic VE and Micklewright A. A pocket guide to clinical nutrition 2004 on behalf of the Parenteral and Enteral Nutrition Group

	diet high in carbohydrate (and low in fat) actually offers some protection against weight gain (Astrup 2001). Furthermore research has shown that the incorporation of sugar within the carbohydrate component of a weight maintenance diet (Saris et al. 2000) or, particularly of a calorie-reduced slimming diet (West & de Looy 2001) can help compliance with these diets by improving palatability without noticeably reducing their effectiveness. Regarding section 459 the respondent points out that although some processed foods may be higher in added sugars, evidence suggests that sugar itself does not appreciably contribute to the energy density of the diet, at least in children (Gibson, 2000). In relation to para 476 the respondent points out that further reviews of the evidence and meta-analysis into the role of sugar-sweetened beverages in weight gain and obesity have been carried out, which confirm the lack of consensus on an effect. Of these, 3 reported a strong association (Olsen & Heitmann 2009, van Dam & Seidell 2007, Vartanian et al. 2007), 1 reported a possible association (van Baak & Astrup 2009) and 2 were inconclusive (Gibson 2008, Bachman et al. 2006). Consistent evidence is lacking and progress in drawing a definitive conclusion is hampered by the lack of good quality data. The respondent believes that long term randomized controlled intervention trials, using reliable measures of diet and physical activity, are required.		
Appendix 9. Characteristics of the data set of DLW measures of energy expenditure o children, adolescents and teenagers	Are concerned about the limitations of the dataset size for infants, children and young adults. Think that it is not clear from appendix 9 how similar the data on energy expenditure measured in UK children is to that measured for children in other countries. Believe this should be clarified. Urge that greater attention should be given to the data available now and additional data shortly to be available from NDNS.	BDA MRC-HNR	Limitations are highlighted in relevant paragraphs. Noted.
Appendix 10. Characteristics of the data set of DLW measures of energy	Are concerned about the lack of UK population data and would welcome further research to establish the evidence based on UK population. The respondent thinks that the decision to base adult energy requirements on datasets from the USA is understandable given the limited UK data currently available. However, the respondent also believes that, the caveats associated with the USA	BDA	Noted. Text amended in light of comments.

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expenditure for adults: combined OPEN/Beltsville DLW data set	datasets need to be emphasised more strongly. These data should not be assumed to be representative of the USA and the relevance to the UK is unknown. Firstly, it is highly unlikely that the participants who chose to take part in the OPEN and Beltsville studies are representative of the USA population, despite the similarity in basic US demographic data. Individuals who choose to join a research study are often 'different' in important lifestyle characteristics than the national 'average'. Secondly, there may be systematic differences in habitual physical activity between the USA and UK.		
	The respondent is concerned that there was not more consideration given as to whether the physical activity level of the participants in the OPEN and Beltsville studies was at the optimum level for health: was there any information in either study on the time spent in different activities? The respondent feels that the increase in the EAR would be easier to justify if it could be explained that this included the energy expended in the recommended level of physical activity.	Public Health Nutrition Research Group, University of Aberdeen	This is discussed under ***PAL values in relation to health outcomes*** (paragraphs 290-291), which indicate that PAL values for optimum health may be of the order of 1.75 or higher. Text added to Appendix 11.

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Table 3 – Risk management issues raised in responses

	Comments	**Organisation/ Individual**	**Actions agreed by working group**
	Are pleased that SACN has recommended the advice for the public to remain the same in relation to eating a balanced diet and increasing physical activity levels but think it will be a challenge to communicate this to the public who already consider advice on healthy eating and physical activity as a confusing and often changing area. Fully recognise that this is a synthesis of the scientific evidence, but caution that this report is not published in a vacuum. Are concerned that increased EAR figures will have implications for the interpretation of the advice for the population in particular around portion sizes and will impact on the ongoing work around nutrient standards for school meals and other Government dietary recommendations which are currently based on Dietary Reference Values. Would like to be reassured that the assumptions of the estimates in the report resulting in increased EAR values for teenagers and adults are very carefully examined and that the guidance for users of the resulting estimates is clear for the purposes to which the figures are used in practice. We would like to see more guidance for users as to which of the three values for Energy requirements (in tables 16 and 17, p.52) should be used and when. Data based on the OPEN and Beltsville studies fail to give any estimate of whether the participants met physical activity recommendations during the measurement - some info from diaries or HR monitors or accelerometers or even questionnaires would be so valuable. This would allow energy levels to be identified e.g. the median value is appropriate for people who meet the physical activity recommendations, the lower value is for those who do little or no moderate exercise and the higher one for people doing an hour or so 5 times a week it would be so much better. At present there is no guidance as to what constitutes 'less' or 'more' active, which could lead to the use of the 'EAR' as a default for sedentary adults. As most people do not reach the current physical activity recommendations for health it could be argued that for the GDA values the 'less active' energy value should be used.	BDA	Following the consultation, SACN reconsidered its approach to setting EAR values and has revised the report accordingly. Risk management issues raised in response to the consultation are outside the risk assessment remit of SACN and will be passed to the Food Standards Agency and Department of Health for consideration.
	Consider appropriate and careful communication of the findings of this report to be critical, to avoid its misuse. To this end, it is important that the proposed increases in the EAR values for energy are not used to signal or encourage an increase in energy	BNF	

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<td>intake by individuals. Nor should they be used to suggest that actual physical activity levels have increased. The respondent sees a need to explain that we now have a better estimate of the energy currently expended by individuals, which is greater than previously thought. It needs to be made clear that the changes in the EAR energy figures are a result of methodological changes in the estimation of energy requirements, in particular the energy expenditure component of energy requirements, based on developments in methods for measuring TEE since 1991.

The respondent believes that given that the EARs for energy could justifiably be raised, it suggests that underreporting of energy intakes in surveys, such as the NDNS, occurs to such a staggering degree that it potentially calls into question the value of any of the food and energy intake data we currently use. It is therefore considered imperative that further research is conducted to improve our understanding of the extent, measurement and management of underreporting of energy and food intake in light of the proposal to raise EAR values for energy.

SACN is advised to not underestimate the impact of any changes in EARs for energy on the various ways that nutrition information about foods is communicated to the general public. For example, shoppers reportedly find it useful to be able to put the energy value of a food in context by considering what proportion of an average day's energy is supplied by that food.

The EARs for energy developed by COMA in 1991 have been used as a basis for widespread dietary advice and information. Importantly, they have been used as the basis for guideline daily amounts (GDAs) which are now commonly displayed on back and front of food labels in the UK.
It is pointed out that in due course, a common position on energy requirements will need to be reached by the EC as the basis for voluntary 'GDA' declarations within the proposed Food Information Regulation. A unilateral change to energy EARs in the UK would need to be managed in this context.

The respondent draws attention to the fact that Energy EARs and energy-related values for macronutrient intakes (total fat, saturates and sugars) have also been used as a basis for:
• signpost labelling,
• the Ofcom nutrient profiling model
• the school meal regulation
• menu planning for institutions,
• dietetic advice,</td>
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	• the proposed nutrient profiling thresholds for nutrition and health claims, • product reformulation (including portion size work) • etc. The respondent urges caution and complete transparency during the risk management stages of this process, and comprehensive engagement with those affected by any decision so as to fully appraise and effectively manage the implications. These implications include the impact on consumer confidence in the information available to them on the food they eat and also on the importance of weight management through diet and activity.		
	The respondent notes that the report authors still highlight that there are limitations to the way they derived physical activity levels for the different groups. This could have consequences for the UK's increasing obesity problem, so it is critical that recommendations for any proposed changes in EAR are validated. The respondent writes that the implications to the NHS and the economy as a whole for getting the EAR wrong are severe. Whilst there are a number of government led projects aimed at reducing obesity and promoting healthier living, the reality is that obesity levels in the UK are continuing to rise. Respondent would like to reiterate that it is important to make sure that any recommendations are valid and it is their suggestion that SACN validate their findings by doing further research. The respondent particularly highlights the assessment of physical activity levels as they believe that the information presented in the report is limited or not representative of the UK population.	Ki Performance (Consultants) Limited	Noted. The need for further research is now stated in Appendix 9.
	Consider the report to be firmly focused on the evidence base to determine energy requirements. However, they are concerned that the issues relating to setting recommendations for energy have received less detailed consideration. This is a matter of great public health importance, especially alongside the ongoing work across government to tackle obesity, most notably those policies linked to front of pack signposting or menu labelling. Respondent would urge the Committee to consider this aspect in its wider context before finalising the report. Importantly the distinction between population energy requirements (for weight maintenance, or normal growth and development in the case of children) and population energy recommendations for a largely overweight nation needs to be more explicit. The media coverage of the draft report has already exposed the need for a more careful distinction to be drawn and for the ramifications for public health guidance to be explicitly set out. Specific comment on paragraph 11: makes the case for using 'average' energy requirements to set a DRV. However it could also usefully discuss the case that DRVs	MRC-HNR	

	for energy may differ from requirements because of the difference in energy needs to maintain weight versus achieving a healthy weight, where in the UK context of an overweight population, there is a need to set recommendations below requirements. It is noted that the terms of reference include a consideration of the implications of the energy recommendations for other nutrients, but that this aspect is not apparent in the report. Think that this needs particular consideration in the light of the recommendations for GDA labelling given that other nutrients are expressed in absolute terms as a percentage of energy.		
	The increase in the EAR could lead to an increase in the GDA for energy and hence for other nutrients for which requirements are expressed as a percentage of energy, such as fat, saturated fat and non-milk extrinsic sugars. Feel it is critical that the assumptions of the estimates in the report are very carefully examined and that the guidance for users of the resulting estimates is clear for the purposes to which the figures are used in practice. The respondent would like to see more guidance for users as to which of the three EAR values in tables 16 and 17 (p.52) to use and when: if the EAR values include optimum physical activity those seeking to estimate the energy requirements for weight maintenance of more sedentary individuals or groups (e.g. in dietetic practice) should be guided towards lower ('less active') values, while for more active individuals or groups (e.g. in sports medicine) the higher ('more active') values might be recommended. Table 10 shows that the current UK health recommendations of 20 minutes moderate intensity activity on 5 or more days a week would increase PAL by 0.15, which is very similar to the difference between the EAR PAL of 1.63 and the PAL for 'less active' of 1.49, whereas the difference of 0.3 between for 60 minutes of active sport times a week could account for the difference between the lower and higher PAL values of 1.49 and 1.78. The respondent believes that making this connection could help users to select the value most suited to their particular purpose: for example, it could be argued that for the GDA the lower value should be used as most people do not reach the recommended level of activity for health. The respondent is concerned that there is no guidance at present, as to what constitutes 'less' or 'more' active, which could lead to the use of the 'EAR' as a default for sedentary adults.	Public Health Nutrition Research Group, University of Aberdeen	
	Expressed concern about the future communication of the draft revised reference values. The seemingly paradoxical message of increased energy requirements for many population groups in the face of an obesity crisis will need to be carefully	*Safe*food	

	managed, and all key stakeholders involved in nutrition communication kept informed.		
	The respondent notes that the draft requirements document suggests an increased Estimated Average Requirement (EAR) for certain sub population groups, but the report stresses that energy expenditure needs to increase in relation to energy intake from food to reduce the number of overweight and obese people.. Furthermore, in paragraph 207 (p.61) the report authors suggest that any increase in physical activity designed to comply with the UK health department's recommendations to increase physical activity would result in future energy recommendations being revised upwards further still. From a public health perspective, however, it seems counter intuitive to the respondent, to increase published energy requirements for a population where 60% of adults are overweight or obese The Trust's various concerns with the report lead it to ask the question: "Should DH be setting EARs which maintain energy balance or EARs which promote health?" The Trust believes that considerable further public and scientific debate on this question is needed before decisions are made which are likely to have significant public health implications. Believes that DH needs to clarify its plans for dissemination of the new recommendations to help the public understand that recommendations for higher energy intake in adolescence relate to levels of expenditure and physical activity. The findings by Swinburn et al showing a strong positive association between EnFlux and levels of overweight and obesity mediate against raising the EAR in this age group. The Trust is concerned that the message will be misconstrued as a license to eat more. Asks, what steps is DH taking to mitigate against this risk? The Trust is concerned that some food manufacturers and large take-away chains may use the increase in recommendations for energy intake to advertise that their products now contain a lower percentage of the EAR or the GDA (which will presumably be revised upward to reflect the new recommendations). The adolescent age group is likely to be a particular target for what would effectively be a misinformation campaign. What steps will DH take with Ofcom, Trading Standards, and other regulators of advertising to reduce this risk? To the respondent, the recommendation to increase the energy requirements of older boys is of concern, as it occurs against a backdrop of rising incidence of obesity and overweight in older boys in the UK. An increase in energy intakes in girls of this same age group could help compliance with requirements for other nutrients e.g. iron, but	School Food Trust	

again there are implications in relation to energy balance.

The respondent considers it likely that if the new recommendations are adopted, the DCSF will need to revise the legislation governing the nutrient-based standard relating to the energy content of an average school lunch. Any changes in the energy requirements would also impact on the nutrient-based standards for carbohydrate, fat, saturated fat and non-milk extrinsic sugars, as these are all based on the energy requirement. Such a decision would need careful consideration given the impact of and timelines associated with modifying this legislation. Because the nutrient-based standards for school meals only became mandatory for primary schools in September 2008 and for secondary schools in September 2009, there is a danger that changes to the recommendations relating to energy and macronutrients may have an adverse impact on engagement by schools and caterers to meet the standards. There may be other sets of recommendations or guidance for the public regarding recommended energy intakes that may be affected in a similar way. The respondent asks, what steps is DH planning to take to work with stakeholders who will need to modify current legislation and recommendations for energy intake based on the EAR?

The Trust believes it is important that any changes to energy requirements are not interpreted as justifying the maintenance of current excess energy intakes of those individuals [with higher TEI than TEE]. Asks, what steps the DH is planning to take in relation to the overweight and obese members of the population to clarify the apparent inconsistency of higher EAR in adolescents and adults with the need to achieve lower body weight?

The respondent points to a recent publication by Swinburn et al [reference below], which sought to identify the relative contributions of TEI and PA on weight gain over the last three decades. The authors investigated the relative contributions of physical activity and total energy intakes to increases in body weight. They conclude that increases in TEI were the main driver for the increase in adult weight gain over the last 30years.
The wider gap between reported TEI and TEE discussed in the article is of concern. The responded believes that, if representative of the true level of underreporting in the UK population, it demonstrates that total energy intakes need to be reduced dramatically by a large proportion of the population in order to return them to BMI within the normal range.

Reference

Swinburn B, Sacks G, Lo SK, Westerterp KR, Rush E, et al. Estimating the changes in energy flux that characterize the rise in obesity prevalence. Am J Clin Nutr 2009; 89:

	1723-8		
	The respondent believes that the draft EARs are set to high and argues that they will be interpreted as a recommendation to eat more: SACN apparently does not recognise that it is effectively making a recommendation to eat more. In this, it can learn from the 1991 COMA report on DRVs that it has otherwise transcended. In the very first sentence of its draft, SACN defines dietary reference values as "criteria against which to judge the adequacy of the food energy intake…." It then immediately equates these with average requirements. SACN does not use the term dietary recommendation at any stage. But it implicitly recognises that this is how its DRV/EAR may be interpreted, because it denies any intent to "signal or encourage" increased energy intakes. In contrast, COMA confronted the issue of interpretation directly. On the very first page of its report, the Committee explicitly states that a dietary reference value is not a dietary recommendation. But then it immediately acknowledges that the ordinary member of the public might not be able to appreciate the difference. COMA is right. And not just about consumers. Nutritionists often refer to DRVs as if they were dietary recommendations. And, more to the point, so does SACN itself. For example, the first table in its 2008 report on The Nutritional Wellbeing of the British Population, provides a "Summary of dietary recommendations", then lists "Energy Intake" among them, citing the "EAR for men 2500kcal/day, for women 2000 kcal/day". In the same report (Para 6), on specific nutrients, it states explicitly that "the DRVs are recommended population averages". If the professional nutritionists on SACN can so easily elide "reference values" and "requirements" into "recommendations", they can hardly complain if the general public does the same. They must recognise that they were, albeit unintentionally, sending a "signal" to consumers. The report does effectively "encourage" an already overweight population to eat more. It is, for practical purposes, recommending that British adults increase their energy intakes in the midst of an obesity epidemic. If that is not the message SACN meant to convey, then it will have to change the report, and not just its wording.	Professor JT Winkler	

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