TOX/MIN/2011/03

Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment

Minutes of the meeting held on Tuesday, 28th June 2011 in Aviation House, London.

Present

Chairman:	Professor D Coggon		
Members:	Mr D Bodey		
	Professor A Boobis		
	Dr R Brimblecombe		
	Professor J Cade		
	Dr R Dearman		
	Dr M Graham		
	Dr A Hansell		
	Professor J Konje	Items 1 to 6	
	Professor B Lake		
	Professor I Morris		
	Dr N Plant		
	Dr Thompson		
Food Standards Agency (FSA) Secretariat:	Dr D Benford	Scientific Secretary	
	Mrs J Shroff	Administrative Secretary	
	Miss R Acheampong		
	Dr C Baskaran		
	Mr T Chandler		
	Mr J Elliot		
	Dr D Gott		
	Mr B Maycock		
	Ms C Mulholland		
	Dr D Parker		
	Dr J Shavila		
	Mr G Welsh		
Health Protection Agency (HPA) Secretariat:	Ms F Pollitt	Scientific Secretary (COC)	
Invited Experts:	Dr P Craig	Durham University	Item 8
	Dr G Rowe	Gene Rowe Evaluations	Item 8
	Dr A Turner	Centre for the Environment, Fisheries and Aquaculture Science (Cefas)	Item 6
Assessors:	Dr G Evans	Veterinary Medicines Directorate	
	Dr D Johnson	Health and Safety Executive	
	Dr C Pease	Environment Agency	
Officials:	Dr R Ackerman	FSA: Secretariat to Social Science Research Committee (SSRC)	Item 8
	Mrs V McFarlane	FSA Food Production Branch	Item 6

	Dr A Tedstone	Department of Health: Secretariat to Scientific Advisory Committee on Nutrition (SACN) -	Item 7
	Dr A Wadge	FSA Chief Scientist	Item 4 & 5
External Observers:	None		

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Announcements

1. The Chairman, Professor Coggon, welcomed Members to the meeting.

2. The Chairman announced that Dr Andy Turner from the Centre for the Environment, Fisheries and Aquaculture Science (Cefas) was attending the meeting to contribute to discussions on item 6 of the agenda. He also announced that Dr Peter Craig from Durham University and Dr Gene Rowe of Gene Rowe Evaluations were attending the meeting to contribute to discussions on item 8 of the agenda.

3. The Chairman announced that this would be the last meeting Dr Johnson attended as the assessor for HSE and thanked him for his contribution. The Chairman also welcomed a new assessor, Dr Evans from the Veterinary Medicines Directorate.

4. The Chairman reminded those attending the meeting to declare any commercial or other interests that they might have in any of the agenda items.

5. The Chairman noted that Members' attendance at recent meetings had been a little disappointing and stressed that it would be helpful if Members who were unable to attend could provide written comments. A Member suggested that the low attendance might be due, in part, to meeting dates being set without the active participation of Members. The Chairman responded that efforts were made to give long notice (>12 months) of meeting dates to Members, and that where possible, the secretariat tried to ensure that dates did not coincide with major scientific conferences. Moreover, Members had the option to propose changing future meeting dates, provided they did so sufficiently far in advance.

Item 1: Apologies for absence

6. Apologies for absence were received from Professors Harrison, Houston and Smith, Dr Foster and Mr Battershill. Written comments were received from one Member.

Item 2: Draft minutes of the meeting held on Tuesday, 22nd March 2011 – TOX/MIN/2011/02

7. The minutes of the 22nd March 2011 meeting were agreed subject to the following amendments (in italics):

Para 14, Line 1: "The Chairman had ~~*provide*~~ *provided* comments"
Para 27, Line 4: "clinically important in patients with compensated ~~*thyroid function*~~ *hypothyroidism*"
Para 29, Line 12: "In the first arm male~~s~~ subjects accounted for 13%"
Para 34, Line 6: "~~*funding*~~ on phytoestrogens"

Item 3: Matters arising

8. The Chairman confirmed that three Members had still not completed their self assessment forms and asked for them to be completed without delay.

FSA-funded research and other progress on mixtures of pesticides and similar Substances

9. The reports for projects T10005 and T10018 had been forwarded to the Secretariat of the Advisory Committee on Pesticides.

Statement on dietary exposure to phthalates – data from the total diet study (TDS)

10. The statement had been finalised by Chairman's action and, along with a lay summary, had been published on the COT website.

Statement on Idiopathic Environmental Intolerance (IEI)

11. The statement had been finalised by Chairman's action and, along with a lay summary, had been published on the COT website.

Item 4: Report of the 2011 Quinquennial Review of the COT – TOX/2011/16

12. Ms Helen Lucas had conducted the quinquennial review of the COT during the first quarter of 2011. She had interviewed several Members, the Chairman, the Administrative and Scientific Secretaries and a number of stakeholders. Members were provided with a paper containing the report of the quinquennial review including preliminary comments from the Secretariat (TOX/2011/16).

13. The Chairman asked whether Members had any general comments on the Review process. He explained that following the discussion, a formal response to the Review would be sent to the General Advisory Committee on Science (GACS) and the FSA Board.

14. Members commented that the review had been conducted against a background of some uncertainty as to its motives. The Chairman reassured Members that reviews of scientific advisory committees were routinely conducted on a rolling basis and were not related to the recent changes in advisory committees across government.

15. The Committee discussed each of the recommendations laid out in the Review in turn.

Recommendation 1 – "The horizon scanning process and the process for determining the work programme should be improved and forward work plan published with proposed timescales for the work"

16. Members commented that there appeared to be some confusion in the review between horizon scanning and forward planning. The rationale for recommending publication of proposed timescales was unclear. The "forthcoming COT meetings" page on the COT website included a list of ongoing and future topics to be discussed. Members considered that providing more detail on the forward work plan would improve transparency and assist Members' planning, but that it should not be too prescriptive with respect to anticipated dates for discussion of particular items. It was agreed that the forward work plan should contain a broad outline of probable topics of discussion with an indication of timescale but not specific dates. The Secretariat would produce a template for consideration at the next Committee meeting. A Member noted that it would be useful for the Committee to receive information on the EFSA approaches to horizon scanning.

Recommendation 2 – "Completed work should be summarised in terms of outcome and impact achieved. This should be updated to track outcomes and impacts over time."

17. Currently outcomes and impacts from the Committee's work were highlighted in three ways:

- verbal reports under "matters arising" at subsequent meetings;
- an annual update paper presented at the first meeting of the year, accompanying the draft Annual Report.
- Members were e-mailed relevant press releases – a recent example was "Introduction of gluten into an infant's diet" released on 10th March 2011.

Members had previously advised that they received adequate feedback.

18. Members considered this recommendation was principally for the benefit of the public rather than the Committee. It was agreed that it might be useful for the impacts of SAC activities on policy to be summarised in their annual reports, and the Chairman would raise this at the GACS.

Recommendation 3 – "The Committee takes greater steps to show evidence of scientific rigour by using the FSA Good Practice Guidelines and Science Checklist more explicitly and also routinely consider whether peer reviews are appropriate for work on which the Committee's decisions are based."

19. In considering the draft text of the COT Annual Report, Members were routinely invited to comment on the extent to which COT evaluations had complied with the Good Practice Guidelines, and if appropriate to make suggestions for future improvements. In addition, Members were asked to complete an annual self-assessment form, judging the COT's performance against the Good Practice Guidelines.

20. The Chair noted that the COT statements always highlighted uncertainties that could impact importantly on conclusions, but felt that tick box confirmation of compliance with the Science Checklist in every COT statement would not be appropriate.

21. Much of the evidence on which the Committee's decisions were based came from peer-reviewed studies in the scientific literature, which were summarised by the Secretariat and the Committee then peer-reviewed the work of the Secretariat. In other circumstances, the Committee was invited to review unpublished research, and itself performed the peer-review function. The Chair noted that, when needed, the Committee invited external experts to assist its discussions, and this was recorded in the minutes and statements.

Recommendation 4 – "The Committee should explore whether there might be mutual benefits from developing links with other, non-FSA bodies in the toxicological arena"

22. It was noted that individual members already had links with other professional bodies through membership of scientific committees and panels, and of organisations such as the British Toxicology Society and Royal College of Pathologists. In addition the COT worked with other committees such as SACN and the Advisory Committee on Pesticides (ACP) when appropriate. However, Members stressed that since the COT was an independent advisory committee, its links to other organisations should normally be on an informal basis.

Recommendation 5 – "The Secretariat should prepare a brief information paper outlining the specific roles and responsibilities of each of the members of the COT Secretariat."

23. A tabled list of attendees included an organogram and short description of job function/area of expertise for each member of the Secretariat. Members agreed that it would be useful to receive information in this form at each meeting.

Recommendation 6 – "The FSA should consider having a core Secretariat team in attendance at each meeting with other members of its Secretariat attending on an "as and when required" basis.

24. The Chairman explained that in addition to taking notes and presenting papers, attendance of members of the Secretariat also fulfilled a general training role for the toxicologists and exposure assessors in the FSA. Members said that they did not feel overwhelmed by the presence of non-Committee members, and concluded that no action was needed in response to this recommendation.

Recommendation 7 – "The Chair and Secretariat should consider Secretariat resources in terms of scientific expertise and amount of resource available when planning COT's work programme and identify and address any gaps as appropriate."

25. Members did not perceive there to be a gap in the scientific expertise of the Secretariat, with the possible exception of epidemiology. It was noted that in the recent past some Members of the Committee had spent considerable time assisting in the drafting of papers when specialist epidemiological knowledge was required. It

was suggested that in some cases, epidemiologists in the HPA might be able to assist.

Recommendation 8 "It is recommended that new Members have an induction meeting with the Secretariat"

26. Members considered that a formal induction meeting was of limited use, and that the best form of induction was to attend a Committee meeting to see at first hand how it worked. It was agreed that in the future, new Members would be invited to observe a meeting before the start of their term of office, followed by a brief introductory meeting with the Secretariat and Chairman to discuss the way the Committee functions.

Recommendation 9 "There is a need to clarify who the Committee's assessors are and the role and responsibilities of assessors and officials."

27. Meetings of the Committee may be attended by Assessors, who are nominated by, and drawn from, the Agencies and Departments that sponsor the Committee, receive its advice, or have other relevant policy interests. In principle all Government Departments and Regulatory agencies could send an assessor to COT, but in practice only one or two attend regularly. Paper TOX/2011/16 outlined the role of assessors in bringing information to the Committee and reporting back to their parent department or agency. A Member mentioned that the term "assessor" was confusing since it implied a role in assessing the performance of the Committee. The Chairman confirmed that the Assessors were welcome to make comments during meetings, as and when they deemed it relevant.

Recommendation 10 "COT should continue to consider whether additional working groups would be appropriate when considering the most appropriate approach to addressing items on its work plan"

28. It was confirmed that the Committee had formed sub-groups or working groups in the past and would continue to do so as and when required.

Item 5: FSA funded research on mixtures of pesticides and similar substances – TOX/2011/17

29. At its meeting on 1 February 2011, the Committee had considered the final reports of 17 research projects funded by the Food Standards Agency, in addition to other actions which addressed recommendations made in the Committee's 2002 report on Risk Assessment of Mixtures of Pesticides and Similar Substances.

30. The Committee had requested further information so that it could finalise its conclusions. In order to help identify priorities for further development and validation work on biomarkers of exposure, the Committee had requested the preparation of a table summarising information on the biomarkers that had been explored, including details on their sensitivity, specificity, whether matrix effects occurred in urine, and whether the pesticides to which they related were authorised for use in the EU or

present in imported foods. In addition, several questions had been posed on the report for project T10011 (Interindividuality in cytochrome P450 and paraoxonase mediated metabolism of mixtures of pesticides), and a question about dose selection had been raised on project T10014 (A study to identify small metabolite biomarkers of effect following exposure to single or mixtures of pesticides).

31. Paper TOX/2011/17 included the requested information. The Committee was asked which biomarkers of exposure should be high priorities for further development and/or validation, and what conclusions could now be drawn on the reports for projects T10011 and T10014.

Biomarkers of exposure

32. Members queried the information on the sensitivity of the biomarkers. It was suggested that limits of detection could be recorded for all the biomarkers, and that further information on exposure would be needed to determine whether the biomarkers were suitably sensitive – for example on the frequency of detection of residues in food or on levels of dietary intake. With this caveat, Members commented on the potential usefulness of each biomarker. It was noted that even if a biomarker was not sufficiently sensitive to quantify low level dietary exposures, it might still be useful in the assessment of exposures of bystanders, residents or workers.

33. In some cases biomarkers had been developed using both liquid chromatography-mass spectrometry (LC-MS) and immunoassays. It was observed that LC-MS based biomarkers had in general worked better, due to matrix effects and cross-reactivity in immunoassays and because combined methods had been developed for the LC-MS analyses which meant that several pesticides could be analysed in the same assay. As such it was suggested that the priority for further development or validation would be the LC-MS methods unless immunoassays were much less expensive. However, one Member considered that the choice would depend on the purposes for which the biomarkers were to be used, and in the case of screening large numbers of people for a wide range of chemicals, immunoassays followed by confirmatory LC-MS analyses could be preferable.

34. A Member stressed that the analyses were of urinary metabolites and that it might not be known whether the presence of these metabolites in urine resulted from exposure to the parent pesticide or from dietary consumption of the metabolite.

35. Some of the immunoassay biomarkers – for several pyrethroids together, carbaryl, phosmet, imazalil, penconazole, carbendazim and thiabendazole – were considered of low priority for further work, either because they had proved insufficiently sensitive, or because more successful LC-MS biomarkers had been developed. In addition, an LC-MS biomarker for paraquat was of low priority since paraquat was no longer used in the EU and was not detected as a residue in food. Diquat was also not detected as a residue in food, but a biomarker might be useful in the assessment of non-dietary exposures.

36. The other biomarkers were considered worth further development, subject to further consideration of exposure levels. For two pesticides, penconazole and

imazalil, further work would be required to confirm that the metabolite for which the biomarker had been developed was a urinary metabolite of the pesticide in humans.

37. In some cases the research reports had referred to the urinary metabolites being detected in unexposed volunteers, which had been presumed to reflect background dietary exposure in those individuals. In other cases there were no such references and it was queried whether this reflected a lack of detection of the urinary metabolites in the volunteers for those pesticides. It was also noted that LC-MS analyses had sometimes detected apparent exposure to a chemical in unexposed, control laboratory animals and that this had been found to be due to analytical cross-contamination. It was queried whether such cross-contamination could be excluded as an explanation for positive findings in unexposed volunteers.

38. It was observed that the time period of detection of a urinary metabolite following exposure was also an important factor in the utility of biomarkers of exposure. It was suggested that if six or seven pesticides were a particular priority because exposures might be at levels of concern, then the focus should be on further developing and/or validating the biomarkers for those pesticides. However, it was recognised that the primary interest was the risk assessment of mixtures, which would require biomarkers to be available for a wide range of pesticides.

T10011: Interindividuality in cytochrome P450 and paraoxonase mediated metabolism of mixtures of pesticides

39. The Committee had been provided with a pre-publication copy of this research report, and the minutes of the discussion of this report will be published when the report is published. The Committee considered responses from the research contractors to questions raised by a Member, and the conclusions that could now be drawn from this research report.

T10014: A study to identify small metabolite biomarkers of effect following exposure to single or mixtures of pesticides

42. The Committee had been provided with a pre-publication copy of this research report, and the minutes of the discussion of this report will be published when the report is published. The Committee considered the outcome of discussion between the Food Standards Agency and the research contractors of a Committee query on dose selection, and the conclusions that could now be drawn from this research report.

Item 6: Measurement of toxins that cause Paralytic Shellfish Poisoning (PSP) – TOX/2011/18

44. COT had previously agreed that High Performance Liquid Chromatography (HPLC) should replace the use of a Mouse Bio-Assay (MBA) for the official monitoring of PSP toxins, provided appropriate quality control measures and suitable method validation studies had been conducted and it could be demonstrated that the HPLC method provided equivalent or better public health protection from paralytic

shellfish poisoning than the MBA method. This had already resulted in the implementation of HPLC in quantitative testing for PSP toxins in mussels, cockles, razor clams and hard clams.

45. It was noted that although the MBA remained the official reference method in the relevant legislation (EC No. 2074/2005), the Regulations allowed use of other internationally recognised chemical methods (the Lawrence HPLC method being specifically mentioned), but that a demonstration of equivalence to MBA performance in terms of public health protection was required. There was also scope within the Regulations for a review of requirements, following successful completion of steps to harmonise the Lawrence method. In response to a Member's question on whether there were any intentions to change the legislation in light of recent developments, it was confirmed that there were no imminent plans but that the Commission might be working to consider this in the longer term. It was also confirmed that the current threshold limits were historically derived using the MBA method, with extrapolation to different shellfish species. It was not known whether any future Commission review would also consider re-calculation of these limits based on HPLC data.

46. Members were presented with three draft reports of new work completed during the last year to extend the scope of the official HPLC method (the Lawrence method) for the quantification of PSP toxins to further UK shellfish species of commercial significance. Members' advice was sought on whether the evidence provided in the three draft reports was sufficient to support a recommendation for the further implementation of HPLC in the official UK monitoring of PSP toxins in oysters, whole scallops and minor clam species.

47. The Chairman welcomed Dr Andy Turner (Cefas) and congratulated him on the quality of the research. Members were asked whether they wished to provide detailed written comments on the reports after the meeting, but agreed that they could cover all the points which they wished to raise in discussion.

48. Members considered a draft report of investigations into the effects of oyster matrix on HPLC and MBA PSP results, and suggested some minor amendments to make the information presented at sections 2, 4.6 and 4.7.1 more meaningful. These would be addressed prior to publication.

49. A member questioned why the authors had chosen specifically to investigate metals in the oyster matrix and why, having taken that decision, they had decided to concentrate on zinc. Dr Turner advised that previous validation work at Cefas had highlighted significant differences in method performance between HPLC and MBA when quantifying PSP toxins in oysters. Although it was thought that the chemical interaction effects between metals and toxins were reversible, work conducted in Canada and Norway had indicated specific biological effects in mice in response to zinc and it was thought likely that metals in the oyster matrix might suppress PSP toxicities in the MBA method, especially as it was known that levels of zinc were approximately ten times higher in oysters than in other shellfish species. The authors had started with a broader set of hypotheses, including consideration of the effects of extraction solvents, matrix effects on fluorescence response and nutritional analysis of shellfish extracts, in addition to the effects of zinc and manganese, but based on the conclusions of previous studies, and in view of limited resources, it was decided

to concentrate efforts on zinc, as the factor most likely to account for discrepancies between the HPLC and MBA methods that had been found previously.

50. Members agreed with the conclusions of the draft report, accepting the evidence that MBA analysis of Pacific and native oysters (containing naturally high concentrations of zinc) significantly underestimated PSP toxicity, whereas, higher concentrations of zinc did not have any effect on the performance of the HPLC method. Members agreed the HPLC method would provide a higher level of public protection and, as it was more accurate, would be a more appropriate method to use for oysters in the monitoring programme.

51. Members next considered a draft report on refinement and validation of the HPLC method for king and queen scallops. Members agreed that as the refined method was so far validated in only a single laboratory, it would be desirable to obtain further inter-laboratory validation. It would also be useful for the monitoring programme if at least one other laboratory were able to perform the method, although this was not essential. Dr Turner informed Members that he had discussed the refinements he had made to the method with other laboratories, including Dr Lawrence (original method developer). All had been supportive and agreed that the modifications he had made comprised only minor amendments to the original Lawrence method, not in any way constituting a new method, so other laboratories wishing to use the technique might only need to demonstrate key performance characteristics, rather than undergo a full new method validation exercise. Members agreed with the report's conclusions and that the method was fit for purpose, supporting the implementation of the modified method for use as the official test for whole scallops.

52. Finally, members discussed a draft report on assessment of the HPLC method for minor clam species. When asked why the report had not compared the method to the MBA. Dr Turner explained that no positive results for PSP toxins had been found using the MBA method in clams, and so in this case, it had been decided to concentrate on a method verification approach. The work followed on from a previous single lab validation study including razor clams and hard clams (amongst other major shellfish species) in which results were compared to those from the MBA method, with generally good agreement between the two methods for clams. Members agreed with the conclusions of the report and noted that in one species "surf clams" there was evidence of toxic conversion to decarbamoyl analogues even in homogenised flesh (confirming that previously noted in a Portuguese study). Members agreed that if the decarbamoyl toxins were not detected by HPLC then authorities could be confident there would not be a risk of paralytic shellfish poisoning. Members therefore supported the implementation of the HPLC method for use as the official test for minor clam species.

53. It was noted that if the presented HPLC methods were implemented as the official tests in the UK, there would be a considerable and very welcome reduction in the number of mice sacrificed. Members were informed that the only outstanding area still to be considered for the implementation of HPLC for PSP testing was shucked scallops (these were only officially tested in Scotland). However, it was anticipated that any laboratory wishing to test shucked scallops would (in addition to UKAS accreditation for use of the method) need only to demonstrate agreed key

performance characteristics of the modified and validated Lawrence method for whole scallops i.e. to verify the method for use in this area.

Item 7: Possible adverse effects of high levels of vitamin D intake – TOX/2011/19

54. As part of the horizon scanning process in February, 2011, Members were informed that the Scientific Advisory Committee on Nutrition (SACN) would be reviewing recommendations on vitamin D at the request of the Department of Health. The COT had been asked to provide advice on possible adverse effects of high levels of vitamin D intake.

55. The effects of high levels of vitamin D intake had been reviewed by the EU Scientific Committee on Food (SCF) in 2002 and by the Expert Group on Vitamins and Minerals (EVM) in 2003, which had proposed a Tolerable Upper Level of 50 µg/day and a Guidance level of 25 µg/day. The most recent review of vitamin D, which had been published by the US Institute of Medicine (IOM) in 2011, established an Upper Level of 100 µg/day vitamin D for adults. Although various endpoints were considered, both of the above upper levels were based on reports of hypercalcaemia in human volunteers taking vitamin D supplements. The contribution of sunlight to vitamin D exposure had not been assessed.

56. The SACN subgroup intended to consider high levels of vitamin D in May/June 2012. To achieve this, the secretariat proposed that the COT consider vitamin D by February 2012 to allow a statement to be prepared and finalised. This assessment would then need to be updated at the end of the review process.

57. It was unclear how the views of the COT would be integrated into the final report, but the COT and SACN secretariats would work together to resolve this; it was thought most likely that it would be as an Annex to the SACN report. It was agreed that it was necessary to be clear about what exactly the COT was being asked to do as the terms of reference were broadly worded.

58. It was noted that COMARE (the Committee on Medical Aspects of Radiation in the Environment) would be providing a contribution on vitamin D and UV radiation. The review of vitamin D would consider the risk-benefit relationship of sunlight exposure and vitamin D formation and the risks associated with excess sun exposure such as skin and eye damage. This would require a common metric to be used, but a QUALY (Quality Adjusted Life Year) or DALY (Disability Adjusted Life Year) calculation would be outside the remit of the work. Rather than establishing a tolerable upper level it might be necessary to assess risk at different levels of exposure. However, a tolerable upper level would help to inform matters such as the design of clinical trials.

59. The current recommendations on vitamin D were that certain population groups - people over 65, pregnant and breastfeeding women, children aged 6 months to 5 years, people who were not exposed to much sun and people with darker skin should take a 10 µg/day vitamin D supplement.

60. It was asked whether a recommendation for fortification was possible. It was agreed that it was possible but fortification, as for folate, was voluntary.

61. It was noted that the National Institute for Health and Clinical Excellence (NICE) had set out guidelines recommending vitamin D supplementation particularly for obese women. Members were informed that NICE were considering undertaking further work on vitamin D but it was hoped that this would be complementary to that of SACN.

Item 8: Report on "Assessment of the COT uncertainty framework from a social science perspective" – TOX/2011/20

62. Professor Boobis declared an interest in that he was a subcontractor in the FSA funded project to review approaches to qualitative evaluation and expression of uncertainties. Professor Coggon declared that he was also on the team, on an unpaid basis. These were not considered to be conflicts.

63. Dr Gene Rowe presented his draft report on a research project commissioned by the FSA to assess the COT's draft uncertainty framework from a social science perspective. The COT was invited to consider the implications of the findings and recommendations made for the ways in which uncertainty is expressed in COT risk assessments.

64. Discussions highlighted that the way uncertainty is framed (descriptive text used) as well as the context affects how people interpret uncertainty. That is, some terms are understood to mean something in one context. but would not necessarily mean the same in another context. This would make it difficult for the COT to develop consistency of wording when expressing uncertainty. For example, IPCC terms are not used/understood in the way that the IPPC notes/expects; people's prejudices underlie how they interpret terms. The COT noted that the context is more important than having a consistent way of expressing uncertainty.

65. A Member asked whether any training had been developed to guide people on how best to express, describe and interpret uncertainty. Dr Rowe responded that he was not aware of any such training, and that it would be very difficult to develop as uncertainty was a complex concept.

66. Members agreed that it would helpful to see the peer-review comments on the report and to hear the views of the Social Science Research Committee.

67. Members affirmed it was important that the major sources of uncertainty and their potential impact on conclusions should be documented in reports, scientific papers and scientific committee opinions. They noted that it would be useful for the COT to have guidance on how uncertainty could be explained in lay summaries. The Chair suggested that for quantitative questions, uncertainty would best be explained by a range of values within which the parameter of interest might reasonably be expected to lie (say with 95% credibility). For qualitative questions, it might be better to express uncertainty in terms of the strength of evidence underpinning the conclusion and how easily it might be overturned by further research..

68. Members agreed there was no immediate need to revise the uncertainty framework in light of the report and discussions. The Chair would discuss the outcome of the research at a meeting of GACS and report back to the COT.

Item 9: FSA Scientific Advisory Committees (SACs) Update – TOX/2011/21

69. Members were provided with a paper outlining the headline topics that other Committees were discussing, and were advised that it would be possible to obtain details on any of the topics if required.

Item 10: Any other business

70. The secretariat proposed that with effect from the September meeting it would be possible to provide access to papers via a secure location on the web accessed via a secure log in rather than sending out paper copies to all Members. Members indicated that they would prefer to have both methods available to them.

71. This was the last meeting that Mr Welsh would attend as part of the secretariat; he was thanked for his contribution to the committee.

Item 11: Date of next meeting

72. The next meeting would take place on Tuesday 13th September 2011 in Conference Rooms 4 & 5, Aviation House, 125 Kingsway, London WC2B 6NH