



FISH INTER-COMMITTEE SUBGROUP

Aviation House

14 April, 2004

Draft Minutes

Attendees

CHAIR: Professor Alan Jackson (SACN Chair)

Professor Ieuan Hughes (COT Chair)

Professor Kevin Chipman (COT)

Dr Timothy Key (SACN)

Professor Christine Williams (SACN)

Dr Diane Benford (COT secretariat- FSA)

Dr Alison Tedstone (SACN secretariat- FSA)

Dr Peter Sanderson (SACN secretariat - FSA)

Apologies

Professor Ian Rowland (COT)

Dr Sheela Reddy (SACN secretariat - DoH)

1. The Chair outlined the purpose of the joint committee meeting: to consider current advice on fish consumption, both the risks and benefits, and current dietary recommendations.
2. The Inter-Committee Subgroup approved the minutes from the last meeting.
3. The FSA's advice on fish consumption (paper tabled), and supporting evidence, was described by the SACN and COT secretariats.
4. It was noted that the toxicological issues are of most concern in pregnant women with respect to both mercury and dioxin-like PCBs; however, during pregnancy and lactation the supply to the fetus and neonate of long chain n-3 polyunsaturated fatty acids (LC n-3 PUFA) is important.

5. The results from preterm infant formula LC n-3 PUFA supplementation trials show a consistent effect on visual acuity; whereas the term infant formula LC n-3 PUFA supplementation trials are less clear.
6. Modelling the supply and demand of LC n-3 PUFA in pregnancy and lactation suggests the need for maternal dietary intake of LC n-3 PUFA. The importance of an adequate supply of LC n-3 PUFA in late pregnancy is demonstrated in the preterm infant formula LC n-3 PUFA supplementation trials; furthermore, transient effects on visual acuity could be important to other longer term functions.
7. Whilst mobilisation of maternal fat depots could provide some of the additional need for LC n-3 PUFA in pregnancy, the observation that the mobilization of fat depots could potentially mobilize fat-soluble toxicants as well as LC n-3 PUFA was discussed.
8. The mechanisms underlying the beneficial effect of fish consumption on cardiovascular disease (CVD) risk were discussed. It was noted that it might be due to antiarrhythmic or even antithrombotic effects and the protective mechanisms may differ at different doses.
9. The dose-response nature between fish consumption and CVD risk was discussed. It was noted that the prospective epidemiological studies generally suggest increased benefit with increased fish consumption, but the randomized controlled trials used only one dose, making it difficult to judge whether they show a dose-response relationship.
10. It was noted that there are few trials examining the effect of maternal LC n-3 PUFA supplementation during pregnancy on later outcomes, especially behavioural outcomes.
11. It was noted that synthesis of the LC n-3 PUFA docosahexaenoic acid (DHA) appeared to be limited in humans of all ages, but this was more so in neonates; therefore, neonates may have a requirement for DHA until weaning. The ability to synthesise DHA appears to be an important consideration, for which there is insufficient evidence.
12. From a toxicological perspective, no risk has been observed in association with fish consumption *per se*; however, toxicants have been shown to be present in fish and these are associated with a potential risk. It was noted that the methylmercury contamination of fish had recently been reconsidered by the COT; dioxins and dioxin-like PCBs were last considered in 2001 when the tolerable daily intake (TDI) was set to define a lifetime intake without appreciable risk.
13. The uncertainties in the evidence regarding the toxicological risk from contaminants found in fish were discussed. It was noted that there were a lot of uncertainties for brominated flame retardants (BFRs), but for the methylmercury and the dioxin-like

PCBs it was possible to identify potentially at risk groups (see below) and the evidence was much clearer.

14. The Inter-Committee Subgroup discussed the evidence regarding dioxins and dioxin-like PCBs to determine whether it was possible to identify groups within the population who were at a greater, or lesser, risk. It was determined that, because of the developmental effects of dioxins and dioxin-like PCBs, women of reproductive age and girls were at greater risk; whereas, women past reproductive age, men and boys were at lesser risk. For those at lesser risk a guidance level for an upper level of fish consumption could be set based on the non-developmental effects of dioxins and dioxin-like PCBs, namely cancer risk.
15. The Inter-Committee Subgroup considered modelling data describing the effect on the total body burden for dioxins and dioxin-like PCBs of short term (twelve month) exceedences of the TDI. It was noted that, because body burden was determined by accumulation up to the age of 20-40 years, during pregnancy and lactation women could increase their intake of dioxins and dioxin-like PCBs to more than double the TDI without appreciable effect on the total body burden. During pregnancy, therefore, a woman could consume two-three portions of oily fish without increased risk, providing her consumption prior to that point had not consistently exceeded the TDI. Acute changes in the dietary intake of dioxins and dioxin-like PCBs are only likely to have modest effects, as determined by the total body burden. It was noted that fat loss through dieting might have a greater influence on blood levels of dioxin and dioxin-like PCBs through mobilisation than that influenced by short-term exceedences of the TDI.
16. It was noted that an equilibrium exists between circulating blood levels and stores (adipose and liver) of dioxins and dioxin-like PCBs, and that by the age of 20 years an individual would already have accumulated 70-80% of the total body burden. The metabolism, and excretion in the bile and faeces, of dioxins and dioxin-like PCBs is very slow, with a half-life of about seven and a half years.
17. The effect of hyperlipidaemia on increasing circulating levels of dioxins and dioxin-like PCBs was discussed. Hyperlipidaemia is anticipated to alter the body distribution of these fat-soluble contaminants, raising blood concentrations. The relationship of blood concentrations to whole body fat content, however, is complex since hyperlipidaemia may be associated with obesity in which case the fat storage capacity is relatively large.
18. The Inter-Committee Subgroup discussed the COT advice on methylmercury contamination in fish. As with dioxins and dioxin-like PCBs, the greatest risk was during pregnancy. Specific concern related to the consumption of swordfish, shark, marlin and tuna. On the basis of the COT opinion, the FSA has advised that pregnant women, women intending to become pregnant and children under 16 should avoid eating shark, marlin and swordfish. One weekly portion of these fish would not be harmful for other adults. Pregnant women and women intending to become pregnant

may eat to up to four medium-size cans or two tuna steaks a week. Children and other adults do not need to restrict the amount of tuna they eat.

19. Possible interactions between BFRs, methylmercury and PCBs found in fish were considered. It was noted, however, that the different classes of contaminant exert their toxicity through different mechanisms not involving the same receptors and therefore that additive toxicity was unlikely.
20. The Inter-Committee Subgroup discussed the possibility of performing a risk-benefit analysis for fish consumption, but the evidence base was deemed to be currently inadequate to perform such an analysis. Further evidence is required to enable this.
21. The measurement of dioxins and dioxin-like PCBs was discussed. It was noted that a volume of 100-300ml was required to determine levels, and breast milk samples were pooled to allow measurement.
22. The Inter-Committee Subgroup requested changes to the report and asked that it state that they had not considered individuals who choose not to eat fish, e.g. vegetarians and vegans, with regard to a dietary source of LC n-3 PUFA, as the evidence base was insufficient to enable this.
23. The Inter-Committee Subgroup stated that whereas there are epidemiological data on the intakes of methylmercury that are harmful to different groups of humans, the information on dioxins and dioxin-like PCBs is less clear because of the need to extrapolate from results of animal studies. The Subgroup agreed that a guideline level for dioxins and dioxin-like PCBs of 8 pg WHO-TEQ/kg bw per day based on cancer risk, as determined by total body burden, could be applied to certain population subgroups: women past reproductive age, men and boys.
24. It was noted that the upper limit for fish consumption, based on dioxin and dioxin-like PCBs, was determined from uncertain evidence. The Subgroup recognized this, stating that it was not possible to conduct an accurate risk assessment. It was decided that a guidance range for oily fish consumption, based on the nutritional and toxicological considerations (levels that are not associated with any undue risk, but which may be beneficial), should be recommended: Recommendations were discussed and agreed.
25. It was noted that consumers would need to be provided with information on the levels of dioxins and dioxin-like PCBs present in different species of commonly consumed fish, and that this should be as comprehensive as possible. This would enable consumers to make informed choices and may influence the precise number of fish consumed per week.