

Final minutes of the 14th December 2022 meeting (TOX/MIN/2022/08)

Item 6: Carbon monoxide and carbon dioxide in aircraft cabin air (TOX/2022/65)

33. Interests were declared by Britta Gadeberg (UKHSA Secretariat) who was an author on one of the papers cited in paper TOX/2022/65. No other interests were declared.

34. The COT had been asked by Department for Transport (DfT) to investigate whether any new data had been published and to re-evaluate their previous view in their statement from 2007 and position statement from 2013 on the cabin air environment, ill-health in aircraft crews and the possible relationship to smoke/fume events in aircraft. Following the May 2022 COT meeting, the request made of COT had been further refined to: "Is there evidence of exposure to chemical contaminants in cabin air that could have long-term health impacts, either from acute exposures or due to long-term low level exposures including mixtures, e.g. of VOCs?". Paper TOX/2022/65 was one of a series of papers considering the topic, and focussed on carbon dioxide (CO₂) and carbon monoxide (CO) in aircraft.

35. Members noted that levels of CO₂ were lower than the workplace exposure limit and the aircraft regulatory limit of 5000 ppm but higher than the ASHRAE limit of 1100 ppm. Members raised questions about the bases for the derivation of such regulatory values used as comparators and requested more information before conclusions could be made. In general, CO levels were below regulatory values for aircraft and air quality standards.

36. The Committee discussed the adverse health effects associated with exposure to CO and CO₂. The Committee agreed that effects of CO₂ should be assessed in terms of acute and chronic exposure as adverse effects may be different. Members also commented that CO₂ could have a consequence on decision making, which was considered to be an adverse effect, following acute exposure but there is little evidence available for adverse effects following low level chronic exposure. It was noted that although CO₂ could be considered a toxicant, it was also important in respiratory drive. In contrast, chronic exposure to CO can be associated with adverse health effects, including on cognition.

37. Members queried the origin of CO₂ in cabin air other than from passengers and requested information regarding air changes in aircraft, especially after the smoking ban was implemented, and how engines compress air. It was agreed that information would be sought from the Civil Aviation Authority (CAA).

38. Regarding CO, Members noted that little information is available correlating CO levels *per se* with adverse effects, but rather effects have been compared with carboxyhaemoglobin levels in blood, which may not be the best biomarker to use as there is considerable uncertainty about the relationship between exposure to CO and blood levels of carboxyhaemoglobin.

39. Overall, Members concluded that levels of CO in aircraft are unlikely to be associated with ill health. For CO₂, more information was needed regarding the derivation of regulatory levels before a conclusion could be made.