

Minutes of 22nd meeting: 11 September 2018

1. Welcome and approval of the draft agenda

- 1.1 The interim Chair, Professor Chris Collins, welcomed all attendees to the meeting (see annex A) and thanked Professor Michael Depledge for chairing the March meeting.
- 1.2 The draft agenda was approved with the addition of a short update on the EA strategic monitoring review provided (item 4b). No items were raised for discussion under any other business.
- 1.3 It was noted by the secretariat that the draft minutes from the March 18 meeting had not yet been circulated for approval.

2. Follow up from the June HSAC workshop and next steps

- 2.1 It was recalled that HSAC held a successful workshop at the University of Reading. As an output of the workshop the committee was developing a short paper with an overall strategy of 'do no harm,' underpinned by six strategies for achieving this. It was hoped that the committee would have a more complete version by December.
- 2.2 There was a suggestion that there may be two papers, one to highlight key issues with the other being a more in-depth look. It was also mentioned that the next Royal Society evidence synthesis project will be on pesticides, chemicals and their interaction with microbial resistance.
- 2.3 Siobhan Amutharasan (Defra) gave a brief introduction, saying that she will be part of the future team working on developing the Chemical Strategy as part of the 25 Year Environment Plan. It was noted that this work is its infancy but that the output from the committee's June workshop was useful and that Defra would be looking to engage with a wide range of stakeholders.
- 2.4 The committee suggested that to build on the June workshop, it would be valuable to invite Defra's Chief Scientific Officer, Professor Ian Boyd, to a future meeting.

3. Use of Persistent, Mobile and Toxic (PMT/vPvM¹) criteria for substances (HSAC/18/4)

3.1 Dr Pippa Curtis-Jackson (EA) gave a presentation providing background on the German Umweltbundesamt proposal (HSAC1804_Anx.1).

3.2 The committee were then asked to respond to the questions set out in the paper (HSAC/18/4):

- It was asked whether in the two cases referenced there was any evidence of harm. In response, it was highlighted that it is difficult to answer this question due to the complexity of the chemical environment. At Rastatt there was evidence of successful detoxification via plants.
- It was noted by a committee member that it is difficult to measure the Perfluoroalkyl Substances (PFAS) due to their persistence and ubiquitous nature. It was also suggested that if measured in the UK, there would be a high level of PFAS. An official highlighted that not all these substances that would be considered under PMT criteria would be fluorinated with some being brominated.
- On whether PMT substances should be considered equivalent to Persistent, Bioaccumulative and Toxic (PBT) substances, a committee member suggested that they should not. They are substances that are of concern but they are of less concern than PBT substances. Some members felt that a quantitative risk assessment approach should be possible for such substances but others expressed doubts about the sufficiency of a quantitative risk assessment under conditions of uncertainty.
- It was observed that the science in this area would always be incomplete and as such this is just as much an ethical issue as scientific. From a non-toxicologist perspective, if the substance is persistent and mobile then it is very likely to occur in drinking water.
- The committee also asked how substances that accumulate over a long period are addressed. In response to this question it was mentioned that the current toxicity tests are chronic long term tests, lasting around five years.
- As a final point, the societal need for non-reactive coatings, of which fluorinated substances are some of the least toxic, was considered. It was proposed that rather than further classification, better management of such substances was needed.

¹ Persistent Mobile and Toxic (PMT) / very Persistent very Mobile (vPvM)

4. How freshwater macroinvertebrates have responded to changes in upstream wastewater treatment over the past 30 years'

4.1 Professor Andrew Johnson (HSAC) gave a presentation around his recently-funded NERC project: 'Does the discharge of chemicals to the environment harm wildlife populations?' and work on the EA's strategic monitoring review.

4.2 The presentation was followed by questions. The committee asked:

- Could any change in pesticide use have contributed to the improvement in macroinvertebrate biodiversity observed in the river Ray? Andrew Johnson responded that pesticides are difficult to monitor and generally occur episodically. The Ray would also have been repopulated from upstream, making changes in pesticide use an unlikely contributor.
- As the water temperature is recorded as rising, have they thought of exploring this? As invertebrates don't thermoregulate, a change in environmental temperature may affect their metabolic processing. Shorter generation times could also drive selection changes. In reply, it was highlighted that with the Swindon site there was a gradual change in temperature but a sharp change in the macroinvertebrate population in 1991.
- What drove the decline in macroinvertebrates in the mid-80s? Coming back on this, it was suggested that the decline was likely due to a lack of capacity in the water treatment plants as the local population was rising. It was only after privatisation that local authorities invested in the infrastructure to meet the Urban Waste Water Treatment Directive.

4.3 An EA official also asked whether there was any measurement of chemical concentrations following the use of Granular Activated Carbon (GAC) at the wastewater treatment plant. In answer, it was noted that in this study, GAC treatment doesn't appear to correlate with an increase in macroinvertebrates. In a previous study, however, a reduction in oestrogen levels with GAC treatment was seen and it may have filtered out other pharmaceuticals.

4b. Environment Agency's strategic monitoring review

4b.1 As HSAC representatives to the scientific advisory group on the EA's strategic monitoring review (see March 18 minutes), Professor Andrew Johnson and Professor John Sumpter (HSAC) provided an update to the committee.

4b.2 The EA's monitoring activities have been grouped under the sentinel and agile networks. There is interest in the redesign of the sentinel network, which is currently seen as solely informing on trends.

4b.3 Proposals for the sentinel network include focussing on the spatial distribution of monitoring sites, based upon modelling data to remove bias. It was noted that this may lead to mothballing of monitoring 'golden sites'.

4b.4 In the redesign, monitoring would not be repeated at sites on an annual basis but rather monitoring would cycle between sites, leading to monitoring of individual sites at greater intervals. The sentinel network would inform of trends, with the agile network being deployed to identify drivers of concerning trends.

4b.5 It was also reiterated that the EA only have one scientific advisory group at present and that such groups are beneficial, noting HSAC's involvement in requesting this group be established for the strategic monitoring review.

5. Preventing risks for people and the environment from hazardous chemical mixtures (HSAC/18/5)

5.1 Professor Michael Depledge introduced the position paper published on 17 April 2018, having identified this as an area for discussion and noting his association with the Solutions project.

5.2 It was intriguing that all the chemical mixtures groups listed as signatories were established separately. The rationale for action was also important, with the paper mentioning the Lancet Report (December '17 meeting) and Chief Medical Officer's (March '17 meeting) report.

5.3 The questions for the committee to consider were: what do you think of these actions and is there anything that the committee should commenting on?

5.4 The following points were raised by the committee in discussion:

- It was noted by committee members that this issue had been on the table for 15 years and not much progress had been made with the current approach.
- A key point within the paper was the need for much better measurement of exposure of both wildlife and humans to mixtures. Currently we are largely uninformed of the real-life exposures and we can't move forward in addressing this problem until we understand this. A committee member commented that in measuring more chemicals to understand exposure, the limitations on the time and effort available needed to be kept in mind, noting that existing studies have only managed to study a small number of chemicals.
- It was agreed that risk assessment for mixtures should be standardised but that it was difficult to identify how it this should be implemented given how different regulatory mechanisms currently operate in silos. Before regulatory action was taken there was also a need to understand the extent to which mixtures are an issue.

- On monitoring for the impact of chemical mixtures, a committee member suggested the focus should be on effects-based monitoring. It was noted that there is not sufficient focus on biological monitoring techniques in the UK or other countries. In further discussion, it was also commented that the effect of mixtures on wildlife populations may not correlate with effects-based monitoring.
- It was also proposed that as a small proportion of the chemicals in a mixture were likely responsible for toxicity, it was important to understand their toxicity. Therefore validated methods for effects-based monitoring on wildlife could be a useful approach rather than looking at 'receptor in a tube' adverse outcome pathway approach. It was also noted that whilst this may not be superior to wildlife monitoring it would provide data in a shorter timescale and could allow for testing effects anywhere.
- It was suggested that as an approach, the labelling of all constituents in products might not be helpful in addressing the mixtures issue.
- The wider points within the paper were also highlighted as being of potential interest for HSAC. These included; the value of networks and pooling data, recognising the importance of both bringing individuals together and the environment such collaborations are created in. The issue of trust in government institutions, including regulatory bodies. Not placing the burden of action on the shoulders of individuals when a risk is identified. The call for a multi/interdisciplinary approach, including the humanities. The reference to the concept of 'safe by design' and the need for evidence-informed policy rather than evidence-based were also seen as positive.
- On the reference to a multi/interdisciplinary approach, it was raised that this might be something that research funders need to address. It was felt that currently funding calls do not have a sufficient breadth of scope for multidisciplinary approaches.
- It was also commented that there is value in working on a bigger scale, citing the Horizon 2020 programme. Here multiple chemicals, were exposed to various models with pooled results showing common effects, which provided credibility to read-across approaches.

5.5 Ovnair Sepai (PHE) also provided a brief statement on mixtures from PHE/FSA committees.

5.6 It was noted that whilst the strategy has not changed, the committees were looking at how to take this forward. The Committee on Carcinogenicity (COC) would be looking at this from a different angle, focussing on Adverse Outcome Pathways (AOP). This would also look at how individual chemicals may not have a direct impact but could influence the effect of other chemicals within such mixtures as well as along an AOP.

5.7 In discussion the European Chemical Industry Council (Cefic) and Chemical Industry Association (CIA) [framework on chemical combinations](#) was mentioned as a good resource. The CIA observer was asked if there had been any further developments in this work. In response, it was mentioned that the policy focus had been on endocrine disrupting chemicals rather than chemical combination effects. They had, however, fed

into the European Food Standards Agency's work and made the tools/approaches available.

5.8 The Chair proposed that based on these discussion the committee would put consideration of this issue on hold for the time being with no formal response to the paper.

6. Updates on the COT, COM and COC (HSAC/18/6)

6.1 Ovnair Sepai (PHE) provided an update on the activities of the Committee on Carcinogenicity (COC), Committee on Toxicity (COT) and Committee on Mutagenicity (COM).

6.2 There was no report on the COT as this is an FSA lead but it was noted that it is trying to finish an assessment of e-cigarettes and are also looking at less than lifetime exposures, which related to previous discuss on chemical mixtures.

6.3 The COC is considering whether an undisclosed (due to commercial sensitivity) compound is genotoxic, which would drive its risk assessment. Two new members had been recruited to the committee.

6.4 The COM was updating it guidance on mutagenicity technology, with a focus on CRISPR technologies.

6.5 The committee asked:

- What aspect of CRISPR technology was being considered? In reply, it was mentioned that the review was focussing on the off-target genotoxicity of this vector-mediated therapy.
- Whether there was any work on the link between obesity and chemicals. The PHE official responded that there are lots of studies on chemical-induced obesity. PHE believe calorie intake and activity are the main drivers but may address data on the influence of chemicals on metabolism and other data in the future.

7. HSAC future form and function*

7.1 A closed discussion was held on the committee's future form and function. This considered previous discussions (March 18' meeting) around future scientific advice and also existing operational issues.

8. AOB

8.1 A committee member asked whether the HSAC might consider the issue of fake cosmetics containing toxic chemicals. This was also raised as an issue in relation to tattoo inks. Ovnair Sepai (PHE) mentioned in response that these issues are consider by PHE and its committees.

8.2 As a point of interest, a committee member flagged that an EU paper had been published on the implications of the 'nano' definition, which HSAC previously considered.

* Closed

Annex A

List of attendees:

HSAC Members

Professor Christopher Collins (Chair)

Professor Michael Depledge

Professor Gary Hutchison

Professor Andrew Johnson

Dr Peter Matthiessen

Professor Richard Murphy

Professor Susan Owens

Professor John Sumpter

HSAC Secretariat

Ryan Hartwell Defra – Chemicals, Pesticides and Hazardous Waste (CPHW)

Katie Dick Defra – CPHW

Other Officials

Chris Green Defra – CPHW

Callum Harris Defra – CPHW

Liz Lawton Defra – CPHW

Siobhan Amutharasan Defra – CPHW

Ruth Coward Defra – CPHW

Martin McVay Welsh Government

Pippa Curtis-Jackson Environment Agency

Tim Besien Environment Agency

Peter Marsden Drinking Water Inspectorate

Ovnair Sepai Public Health England

Observers

Roger Pullins Chemical Industry Association

Jennifer Butcher Chemical Industry Association

Steven Lipworth Royal Society of Chemistry

Apologies

Professor Tamara Galloway