Aggregate exposure

In this guide

195. Aggregate exposure to mercury from food, drinking water, soil and dust, and air were derived by considering a number of scenarios based on the available data. Table 4 shows scenarios of aggregate exposure from the sources listed above and includes estimate of average and high exposure from these sources as indicated below.

196. Average and high exposure for food and drinking water represents the mean and 97.5th percentile exposure. Data for exposure from drinking water in England and Wales were used as this represented the highest exposure compared to Scotland and Northern Ireland. The contribution from air in all scenarios is based on average inhalation rates and the average concentration from an industrial site in England and Wales. For exposure from soil, the average and high exposure represents the mean and 75th percentile exposure respectively for the region with the highest exposure (i.e., urban region as shown in Table 3).

197. Table 4. Aggregate exposure to Mercury from food, drinking water, soil and air*.

Scenarios	**Aggregate exposure (µg/kg bw/day)**	**Aggregate exposure (µg/kg bw/week)**
Average exposure from all sourcesa	0.045	0.315
High exposure from all sourcesb	0.13	0.91
High exposure from food and mean exposure from all other sourcesc	0.12	0.84
High exposure from drinking water and mean from other sourcesd	0.049	0.34
High exposure from soil and mean from other sourcese	0.046	0.32

a This scenario represents a summation of average exposure from food, water and soil and a value for air*.

b Exposure is based on summation of 97.5th percentile estimates for food and water, 75th percentile for urban soil and a value for air*.

c Exposure is based on summation of 97.5th percentile estimates for food and the averages for water, urban soil and a value for air*

d Exposure is based on summation of 97.5th percentile estimates for drinking water and the averages for food, urban soil and a value for air*

e Exposure is based on summation of 75th percentile estimate for urban soil and averages for food, water and a value for air*.

*The contribution from air in all scenarios is based on average inhalation rates and the maximum concentration identified for England and Wales.Risk characterisation

Food

198. Mean total exposure to mercury from food for women of child-bearing age ranges from 0.13-0.29 µg/kg bw/week, whilst exposure in high consumers (97.5th percentile) ranges from 0.62-0.84 µg/kg bw/week. Without considering exposure from non-dietary sources and assuming all mercury is in the form of MeHg, these estimates are below the EFSA TWI of 1.3 µg/kg bw for MeHg (EFSA, 2012).

Drinking water

199. The 97.5th percentile mercury exposure from drinking water for a woman of childbearing age in England & Wales, Scotland and NI is 0.027, 0.0091 and 0.0045 µg/kg bw/week respectively. Assuming all the drinking water mercury is in the form of MeHg, compared to the EFSA TWI (1.3 µg/kg bw), these exposures represent 2.1 %, 0.70 % and 0.35 % of the TWI.

200. The exposures from drinking water alone are far below the TWI. The 97.5% percentile water consumption in women of childbearing age was used and hence the exposures calculated are considered conservative.

Air

201. An average adult female is at worst expected to be exposed to 0.031 µg/kg bw/week of mercury if they live near an urban industrial site. This exposure is equivalent to 0.78% of the inorganic mercury TWI (4 µg/kg bw) and 2.38% of the MeHg TWI (1.3 µg/kg bw). The industrial site air mercury concentration is 5.7

times higher than the urban background concentration so for the general population this value is conservative.

Soil

Table 4. Median and 75th percentile exposure to soil mercury as a proportion of the inorganic and organic mercury EFSA TWI's.

Measure	Region	Mercury exposure (µg/kg bw/week)*	% inorganic mercury TWI (4 µg/kg bw)	% organic mercury TWI (1.3 µg/kg bw)
Median	Non-urban	0.00060	0.015	0.046
Median	Urban	0.0017	0.042	0.13
75th percentile	Non-urban	0.0011	0.028	0.086
75th percentile	Urban	0.0032	0.081	0.25

202. The 75th percentile exposure to mercury through soil ingestion is far below the TWIs and therefore low concern to the general population.

203. The soil mercury concentrations used for the exposure estimate are from England only. No values were available for Wales, Scotland and NI.

204. There is uncertainty regarding sub-populations that exhibit pica behaviour that may regularly consume soils/clays containing mercury; however, due to a lack of data this is not incorporated into the risk assessment.

Aggregate characterisation

205. A combined exposure assessment considered exposure to mercury from all sources at average and high levels. In a scenario where there are high exposures to mercury from all sources (food, drinking water, soil and air) the

estimated aggregate exposure is 0.13 µg/kg bw/day (Table 3) equivalent to 0.91 µg/kg bw/week which is below both the EFSA TWI’s for inorganic (4 µg/kg bw) and organic (1.3 µg/kg bw) mercury. As aggregate exposure estimates under all scenarios are below the EFSA TWI’s the risk of toxicity from mercury is low.