Cadmium in the Maternal Diet - Health-based guidance value

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31. A tolerable weekly intake (TWI) for cadmium was established by the EFSA CONTAM panel in 2009. EFSA noted that the reproductive effects of cadmium, based on the available epidemiology at that time, were uncertain and considered cadmium to be primarily toxic to the kidneys. Hence, the TWI of 2.5 µg/kg bw was based on renal effects. To determine a BMDL5 of 1 µg/g of creatinine, a meta-analysis was conducted between urinary cadmium and urinary β-2-microglobulin as the tubular damage biomarker. An elevated level of β-2-microglobulin of 4 µg/g of creatinine with an adjustment factor of 3.9, accounting for the inter-individual variation of urinary cadmium resulted in the BMDL5 of 1 µg/g creatinine. To enable 95% of the population to have a urinary concentration below 1 µg/g of creatinine by the age of 50, it was calculated that the daily intake of cadmium should not exceed 0.36 µg cadmium/kg bw or 2.5 µg cadmium/kg bw per week (EFSA, 2009).

32. At the 33rd meeting, the Joint FAO/WHO Committee on Food Additives (JECFA) established a Provisional Tolerable Weekly Intake (PTWI) of 7 µg/kg bw in 1988. In 2011, JECFA (73rd meeting) re-assessed cadmium and established a Provisional Tolerable Monthly Intake (PTMI) of 25 µg/kg bw (equivalent to 0.8 µg/kg bw/day), reflecting the long half-life of cadmium and the bioaccumulation in the kidney. Urinary excretion of > 5.24 µg of cadmium per gram of creatinine indicated a sharp increase in β-2-microglobulin (JECFA, 2011). At its 91st meeting in 2021, JECFA calculated national estimates of total dietary exposure to cadmium and compared these to the PTMI established in 2011. Estimates ranged from 0.6 µg/kg bw per month (2.6% of PTMI) in adults in Mali to 24 µg/kg bw per month (96% of PTMI) in children (aged 4-11) in China. It was noted that there were high percentiles occasionally above the PTMI, but on average it was between 20 and 60% of the PTMI. UK and EU data were considered in this analysis but it is unknown where in the range these would have fallen (JECFA 2021).

33. In 2011, following JECFA's re-evaluation, EFSA compared the different approaches used by the EFSA CONTAM Panel and JECFA to determine a health-based guidance value (HBGV). EFSA concluded that the choice of toxicodynamic function played an important role on the outcome (EFSA 2011a) and that the TWI determined by the CONTAM Panel should be maintained "to ensure a high level of protection of consumers, including subgroups of the population such as children, vegetarians or people living in highly contaminated areas". Nevertheless, they also acknowledged that some subgroups could exceed both the JECFA PTMI and the CONTAM Panel TWI (EFSA 2011b).