Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment

COT statement on the potential risks from lead in the maternal diet: Lay summary

The Scientific Advisory Committee on Nutrition (SACN) is reviewing the scientific evidence that bears on the Government's dietary recommendations for women of childbearing age. The Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) was asked to review the risks of toxicity from certain chemicals in the maternal diet. This statement focuses on the possible risks from lead in the diet of women of childbearing age.

Lead is a heavy metal that occurs naturally in the Earth's crust, chiefly as lead sulphide. It is very soft and malleable and has a long history of use in domestic articles such as water and drainage pipes. Lead is ubiquitous in the environment and is thus present in the diet of the general population, including women of childbearing age. The main food contributors to lead exposure are cereal products, potatoes, cereal grains (except rice), and leafy vegetables. Dietary levels have, however, fallen since the phasing out of lead in petrol, plumbing and paints.

The acute effects of lead (from intense exposure of short duration) can manifest as muscle pain, fatigue, abdominal pain, headache, vomiting, seizures, and coma. Chronic lead poisoning from low level but repeated exposure gives clinical signs of persistent vomiting, encephalopathy, lethargy, delirium, convulsions, and coma. The central nervous system (particularly the developing central nervous system in the fetus and children), red blood cell production and the kidneys are most affected by lead exposure, but all body systems can be adversely affected., Lead can cause increased blood pressure and, in pregnant women, may be associated with preeclampsia and premature birth.

Women of maternal age, like everyone else, can be exposed to lead from food, air and ingested soil and domestic dust.

In 2013, the European Food Safety Authority (EFSA) conducted a review of the risks of exposure to lead in the diet. EFSA used the benchmark dose (BMD) approach to establish guidance levels for lead. The BMD corresponds to the level of exposure at which a specified minimal adverse response is seen. For lead, a BMD (in practice a

lower statistical bound, the BMDL) was established for the adverse effect of reduced intellectual development in children, the most sensitive effect. Specifically, a dietary exposure of 0.0005 mg/kg body weight/day was associated with a 1% reduction in IQ score.

Potential risks from maternal exposures to lead were assessed using margins of exposure (MOEs). MOE values are a ratio of the minimal adverse effect level (BMDL) to the estimated exposure level (from diet, soil and air). The larger the MOE value, the greater the margin of safety. EFSA and the COT concluded that an MOE of 10 or greater was sufficient to ensure that there was no appreciable risk of a clinically significant effect on IQ. The COT further concluded that an MOE of >1-10 can be taken to imply that at most, any risk is likely to be small. MOEs <1 do not necessarily indicate a concern, but scientific uncertainties mean that a material risk cannot be ruled out.

The COT compared lead exposures of women of childbearing age to the BMDL for neurological developmental effects. The results indicated that combined exposure from food, drinking water, soil and air would result in MOEs of between 0.9-2 in women of childbearing age, depending on the relative contributions of each source. A worst-case scenario whereby a woman is exposed to high levels of lead from the diet, drinking water and soil for a long time would result in an MOE of 0.9.
The COT concluded that the MOE values indicated that at most any risk of toxicity from lead in relation to the maternal diet and other potential sources of maternal exposure is likely to be small. Therefore, current exposure levels for lead are unlikely to be of any concern to health in the vast majority of women and fetuses.

The full COT statement can be found at: Introduction and Background - Statement on the effects of lead on maternal health | Committee on Toxicity (food.gov.uk)

Lay summary of COT statement 2024/03