Introduction and Background - Statement on the effects of lead on maternal health

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

Statement on the effects of lead on maternal health

Introduction

1. The Scientific Advisory Committee on Nutrition (SACN) last considered maternal diet and nutrition in relation to offspring health in its reports on ‘The influence of maternal, fetal and child nutrition on the development of chronic disease in later life’ (SACN, 2011) and on ‘Feeding in the first year of life’ (SACN,

2018). In the latter report, the impact of breastfeeding on maternal health was also considered.

2. In 2019, SACN agreed to conduct a risk assessment on nutrition and maternal health focusing on maternal outcomes during pregnancy, childbirth and up to 24 months after delivery; this would include the effects of chemical contaminants and excess nutrients in the diet.

3. SACN agreed that, where appropriate, other expert Committees would be consulted and asked to complete relevant risk assessments e.g., in the area of food safety advice. This subject was initially discussed by COT during the horizon scanning item at the January 2020 meeting with a scoping paper being presented to the Committee in July 2020. This included background information on a provisional list of chemicals proposed by SACN. It was noted that the provisional list of chemicals was subject to change following discussion by COT who would be guiding the toxicological risk assessment process: candidate chemicals or chemical classes can be added or removed as the COT considered appropriate. The list was brought back to the COT with additional information in September 2020. Following a discussion at that meeting, the COT agreed that papers on a number of components should be prioritised and to this end, papers on iodine, vitamin D and dietary supplements have been or will be presented to the Committee. The remaining list of compounds were to be triaged on the basis of toxicity and exposure.

4. Following discussion of the first prioritisation paper on substances to be considered for risk assessment by the COT, the Committee decided that each of the heavy metals (lead, mercury, cadmium and arsenic) should be considered in separate papers. The following paper discusses the risks posed to maternal health by lead in the diet and the environment.

Background

5. The Merck Index (15th edition, 2013) describes lead (Pb) as a bluish-white-to-silvery grey group 14 metal, with atomic number 82 and a relative atomic mass of its most abundant isotope of 208. It occurs naturally in the earth’s crust at an abundance of about 0.002%, chiefly as lead sulfide (PbS). It is relatively soft and malleable, has a high density, low melting point, and is relatively inert. These properties led to a long history of use in a variety of applications, including in domestic articles such as drinking vessels and plates and in water and drainage pipes (plumbing, from “plumbum”, the Latin word for

lead). More recently it has been used in paints, ceramic pigments, cosmetics, insecticides, hair dyes, lead-acid batteries, and in the “anti-knock” agent tetraethyl lead in petrol (to improve spark-plug efficiency). Due to its long-known toxicity, many of these uses have been substituted with less toxic alternatives but lead is still used in various applications such as car batteries, pigments, ammunition, cable sheathing, weights for lifting, weight belts for diving, lead crystal glass, some solders and as radiation shielding in the nuclear industry.

6. The Joint FAO/WHO Committee on Food Additives (JECFA) (FAO/WHO, 2011) state that lead contamination of food arises mainly from the environment or from food processing, handling and packaging. Atmospheric lead can contaminate food through deposition on agricultural crops. Water is another source of lead contamination of food. Although lead exists in both organic and inorganic forms, only inorganic lead has been detected in food. Specifically, the major contributors to lead exposure are: cereal products, potatoes, cereal grains (except rice), cereal-based mixed dishes and leafy vegetables.