

Aggregate cadmium exposure from different sources and routes

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Cadmium (Cd) is an omnipresent trace element in the environment (soil, air, water). Environmental Cd levels result partly from its natural occurrence in the earth's crust and mainly from anthropogenic inputs linked to industrial and agricultural activities.

Recognised as carcinogenic, mutagenic and toxic for reproduction, Cd causes kidney damage and bone fragility in humans after prolonged exposure. In France, a risk for the health from an exposure to this contaminant through food cannot be ruled out, with 0.6% of adults and 15% of children exceeding the tolerable daily intake (Anses, 2011). Furthermore, biomonitoring data, integrating all exposure routes, highlight higher Cd impregnation levels, with almost half of the French population exceeding the health-based guidance value (Santé publique France, 2021).

It is therefore necessary to identify the main sources and routes of exposure in order to recommend action levers to reduce human exposure. To this end, within the framework of the European PARC programme (www.eu-parc.eu), a strategy for estimating aggregate Cd exposure from general and occupational environments is being developed, taking into account the multiple sources and routes of exposure (food, smoking, air, work in the metallurgical industry, agriculture, etc.).

Aggregate Cd exposure is estimated by linking the external exposures from the different sources to the internal doses observed in biomonitoring, using a source-to-dose model and a pharmacokinetic model based on human physiology (PBPK). This assessment provides support to decision-makers to take appropriate measures to reduce Cd exposure.

Keywords: cadmium, multiple sources and routes, aggregate exposure

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