Recommendation of health-based biological guidance value for aluminium and its inorganic compounds for workers and the general population

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Human biomonitoring is a useful tool for assessing exposure to chemicals, and the resulting individual and collective health risks, in both occupational and environmental settings. It allows targeting of preventive measures on specific populations or tasks, then to assess their effectiveness. For the interpretation of biomonitoring results, health-based reference values are needed.

For aluminium exposure biomonitoring, this element is generally measured in blood (whole blood, serum or plasma) and/or urine. As blood measurements lack of sensitivity for individual biomonitoring in people with normal renal function, urinary aluminium is preferred as a biomarker of exposure both in the workplace and for the general population. In workers, urine sampling is recommended at the end of shift and end of the working week

Literature analysis showed that the critical effects for aluminium toxicity in humans were neurological and consisted in cognitive impairment (especially in memory and concentration tasks). The available data were estimated sufficient for the recommendation of health-based biological limit values aiming at preventing neurotoxic effects for both workers and general population. A total of 21 cross-sectional studies and 4 longitudinal studies reporting human biomonitoring data and cognitive effects following occupational exposure to aluminium were analysed. Two longitudinal studies were considered for the identification of a point of departure for the elaboration of a biological limit value for workers and a toxicological reference value for the general population.

A general population guidance value corresponding to the 95th percentile of background levels measured in a general population of French adults was also recommended. It allows the identification of overexposure before health-based limit values are attained.