

## Exposure Assessment to Heavy Metals and Flame Retardants Among Moroccan Children and Their Impact on the Epigenetic Profile

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**Abstract :** Industrial products and materials are often treated with additional compounds like brominated flame retardants (BFRs) and heavy metals in order to prevent their ignition, increase their functionality and improve their performance like electrical conductivity. Consequently, this could potentially expose children to harmful chemicals through indoor dust and through hand-to-mouth or toy-chewing behaviors. The aim of this study was to assess the exposure of Moroccan children aged 5-11 years to BFRs and heavy metal elements and investigate their impacts on the epigenetic profile, namely through global DNA methylation modifications. First, parents were asked to answer a questionnaire on children's lifestyle, then blood and urine samples were collected from (n= 93) children, following the ethical guidelines, for biomonitoring and DNA methylation analysis, using a set of solid phase extraction (SPE), LC-MS/MS, GC-MS/MS and ICP/MS techniques. BFRs were detected in 54.84% of samples with a median concentration of 0.01 nmol/mL (range: 0.004-0.051 nmol/mL), while metal elements were detected in more than 90% of samples. No association was found between BFRs and global DNA methylation, unlike metal element levels that showed significant variations with global DNA methylation biomarkers, namely 5-mdC, 5-OH-mdC and N<sup>6</sup>-mA levels. To conclude, Moroccan children could be significantly exposed to flame retardant compounds and heavy metal elements through several routes, such as dust or equipment usage and are therefore susceptible to the adverse health effects that could be linked with such chemicals. Further research is required to assess the exposure to environmental pollutants among the Moroccan population in order to protect Moroccan health and prevent the incidence of diseases.

**Keywords :** biomonitoring, children, DNA methylation, epigenetics, flame retardants, heavy metals, Morocco

**Conference Title :** ICPHR 2024 : International Conference on Public Health Research

**Conference Location :** Dubai, United Arab Emirates

**Conference Dates :** February 12-13, 2024