

DETERMINANTS OF DENTINE LEAD LEVELS IN CHILDREN LIVING IN NEWCASTLE UPON TYNE

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Background and Aims: Lead is a toxic environmental contaminant, associated with irreversible health effects in children who are susceptible due to their developing physiology and behaviour. Research on the association between lead and cognitive impairment in children suggests that there is no safe level of lead exposure. In the UK, studies have found differences in children's tooth lead levels by social class, but little evidence of determinants of exposure. This study aimed to use dentine lead levels (DLLs) to explore determinants of lead exposure in children living in Newcastle upon Tyne, a historically heavily industrialised city in the UK.

Methods: The Tooth Fairy study cohort consists of 69 children aged 5-8 years who donated teeth and whose parents answered a questionnaire. DLLs were measured in primary dentine using Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS). To identify determinants of early life exposure, associations between lifestyle characteristics and DLLs were assessed.

Results: DLLs ranged from 0.06-0.77ug/g, (Mean±SD=0.25±0.16). In univariate analysis, significant determinants of DLL were methods of cleaning floors in the house; growing fruits/vegetables in the garden; and tap water consumption. Multivariate analysis showed that children living in houses cleaned less than weekly had higher DLLs than those residing in houses where floors were cleaned at least once weekly (mean 0.34 vs 0.18, p=0.047); children who drink up to 1/2 pint tap water daily had higher DLLs than those who reported drinking more than 1/2 pint daily ((mean 0.34 vs 0.22, p=0.035). Socioeconomic status, measured by education of the main wage earner, household income or Index of Multiple Deprivation was not significantly associated with DLL.

Conclusions: Unlike other studies, we did not find an association between socio-economic status and lead exposure. Frequency of cleaning hard floors in house is a possible predictor of elevated DLLs, however, cautious interpretation is required.