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### Epidemiology

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## Lead Exposure of Young Children in a French Urban and Industrial Area: Blood Lead Levels and Factors of Variation

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#### Introduction:

Lead poisoning prevention is a priority of public health in France. To evaluate the prevalence of lead poisoning in young children and study the main factors still influencing blood lead levels today, we proposed the determination of blood lead concentration (BLLs) in children living in a urban sector with important traffic, many old houses and next to a battery manufacturing plant in activity since 1890. In this area, concentrations of lead in soils of schools, parks, and private gardens ranged from 39 to 2818 mg/kg; in schools and houses, outside lead dust concentrations ranged from 71 to 20249 g/m<sup>2</sup>, and inside lead dust concentrations from 12 to 9653 g/m<sup>2</sup>.

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#### Methods:

Blood tests were performed with parental agreement among children under 6 years, in 12 schools and 2 day nurseries situated at less than 1 km of the battery plant. The parents completed a questionnaire about risk factors for lead exposure.

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#### Results:

A total of 1213 children participated (participation rate = 83%). Geometric mean of BLLs was 24 [μg/L (range, 23.4-24.7). Nine children had BLLs over 100 [μg/L (0.75%).

The relations between blood lead level and exposure risk factors such as behavior, environment, hygiene, and alimentary habits were studied in a multivariate model. The parameters significantly related to BLLs were: the age (higher BLLs between 3 and 4) and the sex (higher in boys), the date of construction of the residence (higher in houses built before 1948), the clothing hygiene of the child (higher when the clothes cleanliness was bad), the location of the residence with regard to the factory (higher when located at the North-Est, under the wind of the battery plant), the period of the test (higher in September and October), the fact of having a relative working in the factory, and the inactivity of the mother. The presence of scales of painting, of water lead pipes, of softener of water, and recent works in the house of the children did not influence the BLLs.

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#### Conclusions:

Surprisingly, the mean blood level and the prevalence of lead poisoning were quite low in this population attended to be at high risk for exposure. Even at such low levels, usual risk factors of lead poisoning were related to BLLs. This is of great interest to determine who today is still at risk for lead exposure and which are the priority axes of prevention to lower BLLs as much as possible.

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