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Health Status of Workers and their Children Exposed to Lead-Contaminated Soil Near a Lead Smelting Plant in Central Luzon, Philippines

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BACKGROUND/OBJECTIVE: Soil samples collected in the immediate surroundings of a lead smelting plant and in homes of workers showed elevated lead levels exceeding the acceptable standard of 400 ppm.

The proximity of the workers' homes to the facility, their children playing in the surroundings of the plant, and inadequate control measures employed by the smelting plant pose significant health risks to workers and members of their families. The study aimed to determine the current health status of workers and their children exposed to lead-contaminated soil and assess the possible toxic effects of lead.

METHODS: Workers and residents living adjacent to the facility were invited to participate in the health assessment which consisted of occupational history, lead monitoring using Anodic stripping voltameter and, physical/neurologic examinations. Non-verbal IQ testing was performed for children using Wechsler Intelligence Scale for Children-V (WISC-V) tool.

RESULTS: Eighteen workers and 14 children were assessed from September 22, 2017 – January 16, 2018. Mean ages were 35.58 and 10.07 years old for adults and children, respectively. Occupational history revealed significant exposure to chemicals (94.4%), inadequate prevention and control measures (11.1%-33.3%), and incidences of take home contamination (83.3%). Except for abnormal mental status examination (42.8%), the physical and neurologic examination findings were non-specific. Blood lead levels were > 65ug/dL in 92% of workers (mean of 63.3ug/dL) and > 5ug/dL in all children (mean of 50.77ug/dL). Six of 7 children had WISC-V scores of very low to extremely low for Fluid Reasoning Index and Working Memory Index, 3 for Visual Spatial Index and 2 for Processing Speed Index.

CONCLUSION: Complete exposure pathway to lead from contaminated soil was observed as evidenced by the elevated levels of lead among workers and their children. Children were more affected than their fathers as shown by the low IQ scores.