
Children's Environmental Health Research Findings
February 2011

Topic: E-waste

Title: Developmental neurotoxicants in e-waste: an emerging health concern

Conclusion: Living close to informal e-waste recycling sites may pose risks for fetal and child neurodevelopment.

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Abstract: OBJECTIVE: Electronic waste (e-waste) has been an emerging environmental health issue in both developed and developing countries, but its current management practice may result in unintended developmental neurotoxicity in vulnerable populations. To provide updated information about the scope of the issue, presence of known and suspected neurotoxicants, toxicological mechanisms, and current data gaps, we conducted this literature review.

DATA SOURCES: We reviewed original articles and review papers in PUBMED and Web of Science regarding e-waste toxicants and their potential developmental neurotoxicity. We also searched published reports of intergovernmental and governmental agencies and Non Governmental Organizations on e-waste production and management practice.

DATA EXTRACTION: We focused on the potential exposure to e-waste toxicants in vulnerable populations, i.e., pregnant women and developing children, and neurodevelopmental outcomes. In addition, experimental evidence of developmental neurotoxicity and mechanisms are summarized.

DATA SYNTHESIS: In developing countries where most informal and primitive e-waste recycling occurs, environmental exposure to lead, cadmium, chromium, polybrominated diphenyl ethers (PBDEs), polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs) is prevalent at high concentrations in pregnant women and young children. Developmental neurotoxicity is a serious concern in these regions but human studies of adverse effects and potential mechanisms are scarce. The unprecedented mixture of exposure to heavy metals and persistent organic pollutants warrants further studies and necessitates effective pollution control measures.

CONCLUSIONS: Pregnant women and young children living close to informal e-waste recycling sites are at risk of possible perturbations of fetus and child neurodevelopment.

Policy Implications: Country-level policies to reduce pollution from e-waste recycling should be considered.

Keywords: e-waste, neurodevelopment