

Topic: Exposure to electronic waste

Title: Health consequences of exposure to e-waste: a systematic review

Conclusion: Although data suggest that exposure to e-waste is harmful to health, more well designed epidemiological investigations among children are needed to confirm these associations.

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Abstract:

Background: The population exposed to potentially hazardous substances through inappropriate and unsafe management practices related to disposal and recycling of end-of-life electrical and electronic equipment, collectively known as e-waste, is increasing. We aimed to summarise the evidence for the association between such exposures and adverse health outcomes.

Methods: We systematically searched five electronic databases (PubMed, Embase, Web of Science, PsycNET, and CINAHL) for studies assessing the association between exposure to e-waste and outcomes related to mental health and neurodevelopment, physical health, education, and violence and criminal behaviour, from Jan 1, 1965, to Dec 17, 2012, and yielded 2274 records. Of the 165 full-text articles assessed for eligibility, we excluded a further 142, resulting in the inclusion of 23 published epidemiological studies that met the predetermined criteria. All studies were from southeast China. We assessed evidence of a causal association between exposure to e-waste and health outcomes within the Bradford Hill framework.

Findings: We recorded plausible outcomes associated with exposure to e-waste including change in thyroid function, changes in cellular expression and function, adverse neonatal outcomes, changes in temperament and behaviour, and decreased lung function. Boys aged 8-9 years living in an e-waste recycling town had a lower forced vital capacity than did those living in a control town. Significant negative correlations between blood chromium concentrations and forced vital capacity in children aged 11 and 13 years were also reported. Findings from most studies showed increases in spontaneous abortions, stillbirths, and premature births, and reduced birthweights and birth lengths associated with exposure to e-waste. People living in e-waste recycling towns or working in e-waste recycling had evidence of greater DNA damage than did those living in control towns. Studies of the effects of exposure to e-

waste on thyroid function were not consistent. One study related exposure to e-waste and waste electrical and electronic equipment to educational outcomes.

Interpretation: Although data suggest that exposure to e-waste is harmful to health, more well designed epidemiological investigations in vulnerable populations, especially pregnant women and children, are needed to confirm these associations.