



Uncontrolled electronic waste recycling threat to children's health

Current EU policy on Waste Electrical and Electronic Equipment (WEEE)¹ highlights the need for greater recycling of electrical and electronic equipment to limit the total quantity of waste going to landfill. However, research carried out in China suggests that if recycling is not carried out safely then there is a significant risk to human health and the environment.

The researchers from Hong Kong studied Guiyu, a village in southeast China which has a significant electronic circuit board recycling industry. Villagers melt solder from the circuit boards and sort electrical components, which they sell to electrical appliance factories. Circuit boards contain many toxic metals. The researchers tested dust from the recycling workshops, and also from the nearby road, food market and schoolyard. They found high levels of dangerous heavy metals which would have an impact on the health of the recycling workers and would pose a high risk to children.

The researchers tested for the metals cadmium, cobalt, chromium, copper, nickel, lead and zinc. These metals can cause both acute and long-term toxicity. Of these metals, high levels of lead and copper were the greatest cause for concern. High lead levels are associated with lower IQ in children. Other research has shown that both workers and children in Guiyu have a high incidence of bone disease, as well as digestive, neurological and respiratory problems, which may be linked to metal toxicity.

A risk assessment indicated that recycling workers could be exposed to 50 times the safe oral lead dose. Workers transport the metals into their homes from the workshop as dust, transferring the dust to their children. In a separate study, children of circuit board workers were found to have higher levels of lead in their blood than those whose parents recycled plastics. The metals get into the body through the skin or when dust is inadvertently eaten or breathed in. The health risk to children at all locations around the village was around eight times greater than that to adults.

Few studies to date have determined the extent of the problems caused by uncontrolled electronic waste recycling. Similar waste is commonly recycled in African countries as well as India and Vietnam. Awareness of the consequences of uncontrolled recycling could prevent some of the same mistakes being repeated in these countries.

The amount of WEEE generated in the European Community is growing rapidly and Policy makers would like to see more WEEE recycling. The EU WEEE directive seeks to encourage safe recycling, addressing issues such as managing the risks of handling hazardous components, which as this case study shows, can cause concerns if recycling is not carried out safely.

1. For information on the European Commission's WEEE directive, see: http://ec.europa.eu/environment/waste/weee/index_en.htm

Source: Leung, A.O.W., Duzgoren-Aydin, N.S., Cheung, K.C. and Wong, M.H. (2008). Heavy metals concentrations of surface dust from e-waste recycling and its human health implications in southeast China. *Environmental Science & Technology*. 42 (7): 2674-2680.

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