

5.003 Assessing risk to human health for heavy metal contamination through street dust in the Southeast Asian Megacity: Dhaka, Bangladesh.

Early Career Scientist

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Abstract:

Abstract: Heavy metal contaminations in street dust due to high traffic sites and industrial areas in the Southeast Asian Megacity (Dhaka City, capital of Bangladesh) were investigated in 88 street dust samples from 22 sampling sites. This study revealed the maximum Pb, Cd, Zn, Cr, Ni, As, Mn and Cu contents in the street dust samples. The spatial distribution of heavy metal concentrations in street dust samples of Dhaka City was determined using geographical information systems. The risk assessment strategies were used for this study for identifying the routes of exposure through oral ingestion, inhalation, and dermal contact by the fine particles ($\sim 75 \mu\text{m}$) of street dust, especially for children based on the US EPA health risk models. Both non-carcinogenic and carcinogenic risks of heavy metals were characterized in street dust samples. Results based on the hazard index (HI), in the case of non-cancer effect, the ingestion of dust particles of children and adults in Dhaka City appeared to be the route of exposure to street dust that results in a higher risk for heavy metals, followed by dermal contact. This study revealed that the inhalation of re-suspended particles through the mouth and nose were almost negligible. It was also noticed that children were experiencing the potential health risk due to HI for Cr (1.04), which was slightly higher than the safe level 1 and Cd (0.69) was close to the safe level 1. Reversely, cancer risk for Cr (i.e. 4.27×10^{-6}) was fallen within the range of threshold values (10^{-4} - 10^{-6}) and As (i.e. 9.59×10^{-7}) was close to the upper limit of threshold values (10^{-4} - 10^{-6}).

Keywords: Street dust, pollution, toxic elements, health risk assessment