Seminar Series 2015 - 2016

Southern Ontario Centre for Atmospheric Aerosol Research
University of Toronto

The influence of clothing on exposure to methamphetamine, phthalates and nicotine

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Analyses of exposure to indoor air pollutants focus primarily on inhalation of gases and particles. However, other routes of exposure can become important for lower volatility chemicals. In this seminar, clothing is investigated as a vehicle for concentrating lower volatility organic species such as methamphetamine, phthalates and nicotine, which can then be taken up by oral or dermal routes. Methamphetamine is an example of a highly water (and saliva) soluble compound that can become highly concentrated in clothing simply by air-to-fabric transfer. Toddlers that mouth fabrics in a house with even very-low concentrations of methamphetamine can ingest a substantial dose. We also hypothesized that wearing clothing should increase dermal uptake if the fabric was first allowed to equilibrate with certain SVOCs present in indoor air. Simple mass transport models demonstrate that close-fitting clothing would reduce external mass-transport resistance and increase uptake relative to bare skin. To experimentally assess the effect, we measured uptake of selected airborne phthalates for an individual wearing clean clothes or air-exposed clothes and compared these results with dermal uptake for bare-skinned individuals under otherwise identical experimental conditions. When compared against the average results for bare-skinned participants, clean clothes were protective, whereas clothes exposed to phthalates dramatically increased dermal uptake of DEP and DnBP. Preliminary experiments with nicotine also show that clothing is also likely to contribute to dermal dose in environments subject to tobacco smoke or vaping.

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Wallberg Building, 200 College Street, Room 215

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