Title *

The impact of e-cigarettes and tobacco heating products on indoor air quality

Abstract *

Electronic cigarettes and tobacco-heating products (THPs) may, through appropriate design and stewardship, reduce environmental emissions of particulate matter, combustion-derived toxicants and residual odour compared with cigarette smoke. For this study, 6 products were assessed; 2 conventional cigarettes, 1 THP (glo^{TM}), 2 e-cigarettes (Vype ePen2 and Vype Pebble) and 1 hybrid tobacco heating product (iFuse^{TM}); all British American Tobacco products. Emissions were measured over four hour exposures, conducted in a 37.8m^3 environmental chamber used to simulate residential, office and hospitality ventilation conditions. For odour, a trained panel assessed residual tobacco odour on cloth, hair and skin post-exposures with significant reductions observed in all three categories. For emissions, Volatile Organic Compounds (VOCs) were less than or equal to background (occupied) room samples for total VOCs (TVOC) and 7 specific VOCs. For carbonyls, formaldehyde and acetaldehyde were greater than background but significantly lower (> 90 %) than equivalent cigarette smoke data; acrolein and crotonaldehyde were not raised over background levels. Nicotine was significantly reduced (>95%) versus cigarette smoke. Carbon monoxide and oxides of nitrogen were below LoD implying a lack of combustion by-products. All aerosols were sub-micron with mass median diameters from 160-240 nm. Particle number and mass concentration were significantly reduced (> 98 %) for THP and e-cigarettes versus cigarettes, with incremental concentrations < 10 µg.m^{-3} during even intense use. In conclusion, these data show that these new nicotine and tobacco products have the potential to significantly reduce chemical and particle emissions in indoor environments.

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