**1. Introduction**

- Electronic cigarettes (e-cigarettes) represent a rapidly-emerging product category that holds promise as a conventional tobacco cigarette alternative.
- There is growing interest from regulators and public health organizations on whether the aerosol exhaled from such products has implications on the quality of air breathed by bystanders.
- As e-cigarettes do not contain tobacco and there is no side-stream aerosol generated, the only source of potential bystander exposure would be to nicotine and base components that may be present in the exhaled aerosol.
- It has been suggested that nicotine from cigarette smoke can be deposited on indoor surfaces, where it can be released again to the gas phase or react with ozone, ambient nitrogen oxide and other atmospheric oxidants producing secondary chemicals, such as tobacco-specific nitrosamines (TSNAs).
- This scenario is not supported by research: third-hand smoke, and it has been suggested that this may present a potential health hazard to bystanders [1,2].
- Numerous studies have demonstrated that exhaled closed system e-cigarettes aerosols contain negligible amounts of nicotine (reviewed in [3]) and there was no measurable increase in the level of nicotine on the surface after cig-a-like e-cigarette use [4].
- To our knowledge, no study assessing the potential impact of exhaled e-cigarette aerosols on indoor air quality and surface deposition following use of open system e-cigarettes has been reported.
- In the present study we aimed to understand the contribution of exhaled aerosols to the ongoing chemicals in ambient indoor air and the potential deposition of nicotine to indoor surfaces before, during and after unrestrictive use of a blu™ open system e-cigarette.

**2. Setting, Sampling and Analysis**

- To assess indoor air quality within a real-life environment, a meeting was conducted in a small office with five volunteers (three experienced, regular e-cigarette users and two non-users) who had given informed consent.
- Spot sampling for airborne constituents was conducted the day before product use, during room occupation but before vaping started, during the vaping session, after vaping ceased but room was still occupied and the day after product use.
- Surface wipe samples were collected before e-cigarette use was permitted (control period) from the walls and desk flat surface close to the e-cigarette users in the office and 40 min and 24 hr after e-cigarette use ceased (Figure 1).
- During the vaping session, three of the five participants used the commercial product blu™ PRO open system (Fortem Ventures) containing 1.8% nicotine classic tobacco flavour e-liquid [refilled by the consumer]. Products were consumed ad libitum (i.e. with no restrictions how to consume the product) over the course of 135 min.

**3. No Negative Impact of E-Cigarette Use on Ambient Air Quality**

- The experiment was conducted in a UK office of dimensions 4.20 x 2.95 x 3.05 m. The office was under natural ventilation conditions and all windows and doors were kept closed during the study. The average measured ventilation rate was 0.7 air changes per hour.

**4. No Increase in Surface Nicotine Levels After E-Cigarette Use**

- Samples taken prior to e-cigarette use indicated the presence of trace levels of nicotine. This was unsurprising, as nicotine is reportedly widely present in the environment [6,7].
- The results presented here relate to the products which were tested and may not be generally applicable to all other e-cigarette products such as Advanced Personal Vapourisers (‘MODs’). User topographies and technology difference may impact exhaled aerosol characteristics/properties. Further research in these areas will be informative.

**References**


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