Qeios

Peer Review

Review of: "Exposure to Benzene, Toluene, and Xylenes from Electronic Cigarette Use Compared to Working Environment Permissible Exposure Limits: A Risk Assessment Analysis of a Recent Publication"

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The manuscript presents an analysis and critique of a recent study on the exposure risks of certain harmful chemicals (benzene, toluene, and xylenes) from e-cigarette use, demonstrating the importance of using scientifically accurate methods to assess exposure risks and providing a clearer picture of the relative safety of e-cigarette use in comparison to occupational environments.

Strengths:

- **Clarity of Methodology**: Emphasizing the importance of total daily exposure limits provides a more accurate risk assessment.
- **Appropriate Conversions**: The corrected conversions from ppm (parts per million) to μg/L are important for ensuring that the results are scientifically sound and comparable to established guidelines.
- **Potential for Misleading Comparisons**: The original study's comparison of very short-term inhalation (one breath) with long-term consumption (e-cigarette use over days) is misleading and does not provide a proper risk assessment. Addressing the misleading nature of short-term vs. long-term exposure comparisons is crucial.
- **Risk Mitigation**: The study shows that exposure from e-cigarettes is far lower than that from occupational environments with known safe exposure limits, which may help mitigate concerns

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about e-cigarette safety in comparison to workplace hazards.

- **Implications for Policy**: This analysis could be useful for policymakers and health organizations to reassess the risks associated with e-cigarette use, potentially influencing regulations and public health recommendations based on more accurate data.

Areas for Improvement:

1. **Real-World Variability in E-Cigarette Usage**: The study assumes a consumption of 5 mL of e-liquid per day based on surveys. However, e-cigarette use can vary significantly among users, and this assumption may not reflect the full range of real-world usage patterns. Acknowledging the variability in e-cigarette use among different users is important.
2. **Limited Scope of Chemicals**: The study focuses only on three chemicals—benzene, toluene, and xylenes. E-cigarette aerosol likely contains many other chemicals that could contribute to health risks. Expanding the focus beyond benzene, toluene, and xylenes to include other harmful substances would provide a more comprehensive risk evaluation.
3. **Lack of Data on Chemical Transformation**: E-cigarettes operate by heating e-liquid to create an aerosol, which could lead to chemical transformations (e.g., formation of formaldehyde or other potentially harmful by-products). Discussing potential chemical transformations during the vaping process could enhance the study.
4. **Exposure Routes and Population Vulnerability**: The study focuses solely on inhalation exposure in a workplace context. However, it may not account for other vulnerable populations who might use e-cigarettes, for example, individuals with pre-existing respiratory conditions, who might be more susceptible to the adverse effects of these chemicals. Considering vulnerable populations and other exposure routes would add depth to the analysis.
5. **Assumption of Consistent Environmental Conditions**: The study assumes an 8-hour work shift with moderate activity and does not account for variations in environmental conditions (e.g., air ventilation, room size) and device differences (e.g., temperature, power) which could influence the actual exposure to these chemicals in a real-world setting. The study also assumes that e-cigarette use is the sole source of exposure, whereas other sources of benzene, toluene, and xylenes in the environment could contribute to overall exposure. Addressing variations in environmental conditions and device differences could improve the accuracy of the exposure assessment.

Declarations

Potential competing interests: No potential competing interests to declare.