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LB-1334-4 Exposure to second-hand aerosol produced by electronic cigarettes: a systematic review

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Background: Since 2007, the use of electronic cigarettes has grown rapidly around the world. This trend raises concerns about the potential exposure of bystanders to aerosols from electronic cigarettes, particularly considering that its use in public workplaces and other enclosed places is not regulated in most countries. This study aimed to review systematically the evidence on the content of, and exposure to, second-hand aerosols (SHA) from electronic cigarettes and other smoking-proxy electronic inhaling systems (SEIS).

Methods: A systematic review of original articles published up to August 2016 was performed using PubMed and Web of Science databases. The search strategy combined the topics "SEIS", "aerosol", and "second-hand exposure". The studies included in the selected articles were described according to whether they focused on aerosols produced by humans (SHA) or generated by smoking machines (first-hand aerosol, FHA), including aerosol composition and the exposure to, or effects of, the aerosol in humans.

Results: Some articles included more than one study, thus 62 studies from 58 publications were included into the final review. Twenty studies focused on SHA (18 analyzed its composition and 2 assessed human exposure) and 45 studies focused on FHA (43 analyzed its composition and 2 assessed human exposure). The content and concentration of toxic chemicals emitted from SEIS are highly variable, and include propylene glycol, particulate matter, volatile organic compounds, heavy metals, and nicotine. These chemicals could be taken into bystanders' bodies, as evidenced by cotinine measurements. The levels of some metals, such as nickel and chromium, are higher in SHA from SEIS than in second-hand tobacco smoke and certainly in background air.

Conclusions: SHA is a new air contamination source for toxic chemicals. Their concentration is higher than background levels and the associated health risks are still empirically unknown.

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