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# An Exploration of Flavours in Studies of E-Cigarettes for Smoking Cessation: Secondary Analyses of a Systematic Review with Meta-Analyses

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## Objectives

- To investigate patterns of e-cigarette flavour use in people using e-cigarettes to stop smoking in intervention studies
- To estimate associations between e-cigarette flavours and smoking abstinence and study product use at 6 months+

## Conclusions

- Some people using e-cigarettes to quit smoking switch between e-cigarette flavors during a quit attempt
- Sweet flavors may be preferred overall, but this may differ depending on context
- There is no clear association between the use of e-cigarette flavors and smoking cessation or longer-term e-cigarette use, possibly due to a paucity of data

## Methods

- Secondary analyses of a Cochrane living systematic review of e-cigarettes for smoking cessation (Lindson 2024)
- Included studies provided adults who smoked combustible cigarettes with nicotine e-cigarettes for smoking cessation and provided data on e-liquid flavour use
- Incorporated studies found up to Feb 2024
- Outcomes included flavour use; smoking abstinence; abstinence from all tobacco or commercial nicotine products (excluding NRT); long-term study product use
- Risk of bias assessed using Cochrane RoB 1
- Data synthesised using narrative syntheses and meta-analyses subgrouped by flavours provided, with outcomes reported as risk ratios with 95% confidence intervals

## Results

- We included 25 studies (n=16,748)
- 21 studies contributed to sub-grouped meta-analyses
- 18 studies provided participants with a choice of e-cigarette flavours
- One study (Xu 2023) randomised participants to different e-liquid flavours
- We judged 15 studies at high, 7 at low, and 3 at unclear risk of bias

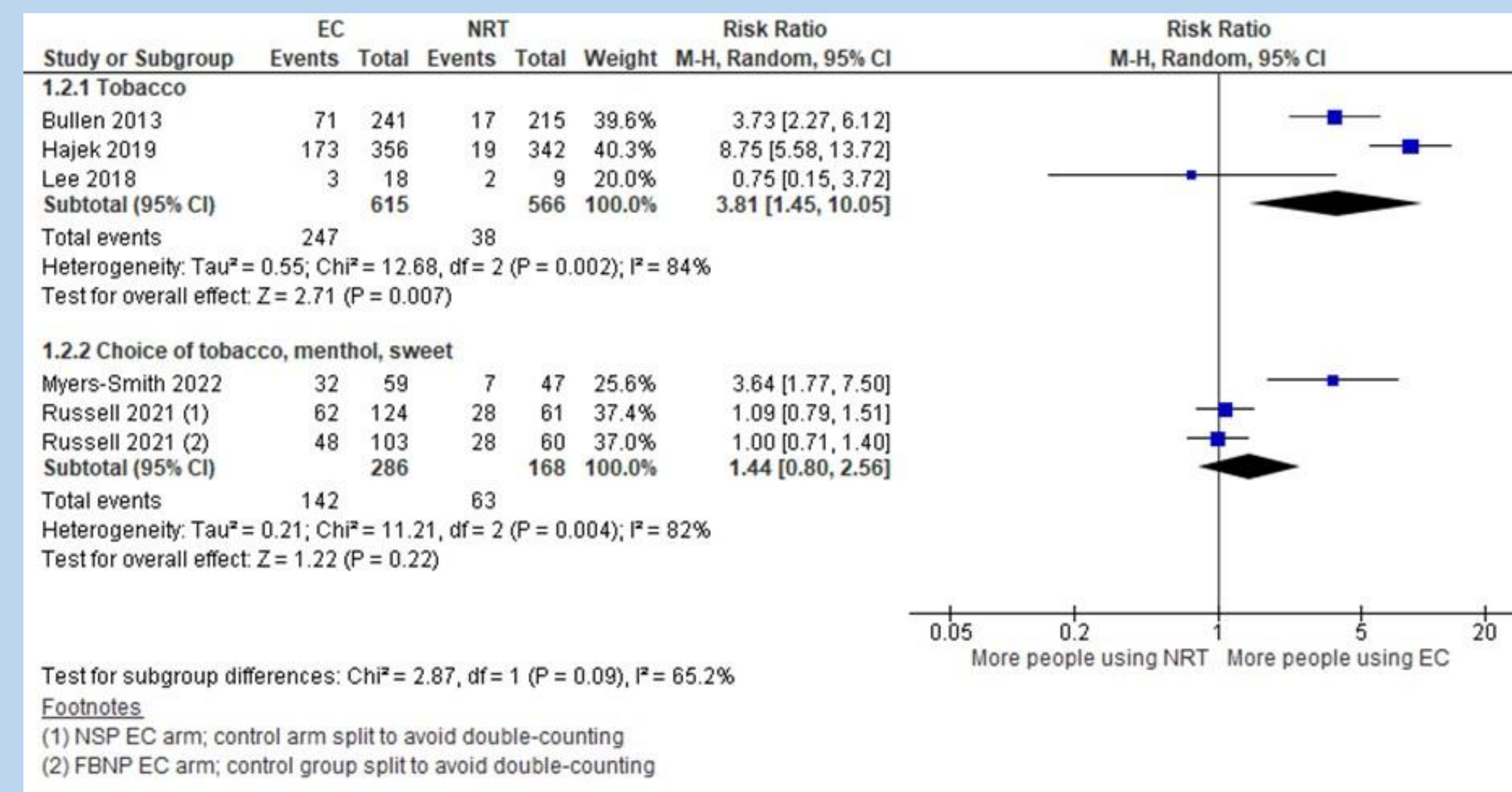


Figure 2: Forest plot subgrouped by flavours provided for study product use outcome; e-cigarette vs. NRT comparison

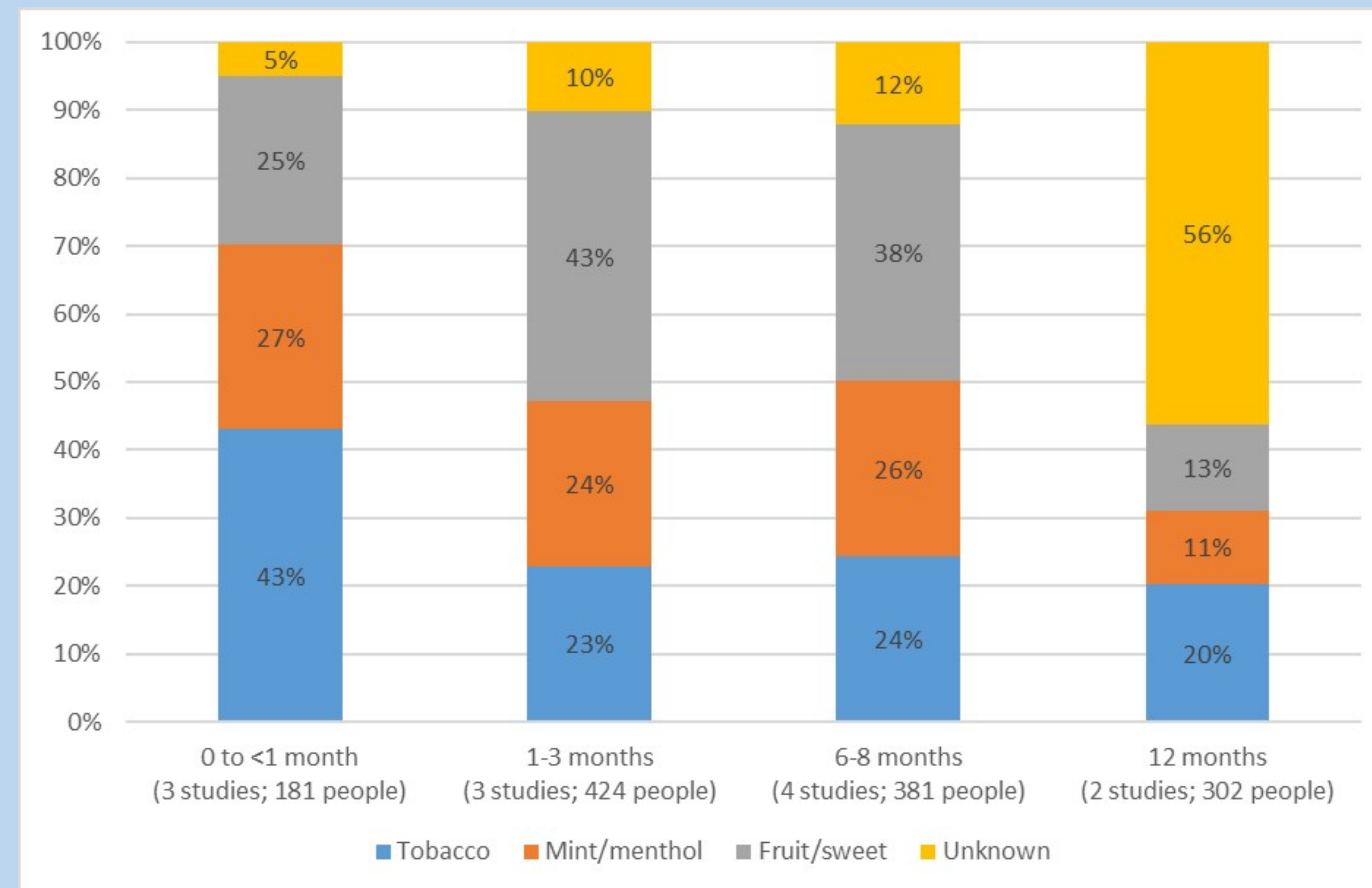


Figure 1: Flavour choice over time in five studies providing options including tobacco, mint/menthol and sweet flavours

- Where participants had a choice of flavours, and this was tracked over time, some switching between flavours occurred (Fig.1)
- There was an indication that sweet/fruit flavours were preferred over tobacco and menthol; however, there were differences across studies
- Subgroup analyses showed no clear associations between flavours provided and smoking cessation or study product use (e.g., Fig 2)
- One study (Xu 2023) randomised participants to two flavour conditions (tobacco vs. choice of sweet, tobacco, menthol) and found similar smoking abstinence and long-term e-cigarette use between arms at 12m

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## References

Bullen C, Howe C, Laugesen M, McRobbie H, Parag V, Williman J, et al. Electronic cigarettes for smoking cessation: a randomised controlled trial. *The Lancet*. 2013;382(9905):1629-37

Hajek P, Phillips-Waller A, Przulj D, Pesola F, Myers Smith K, Bisal N, et al. A randomized trial of e-cigarettes versus nicotine-replacement therapy. *New England Journal of Medicine*. 2019;380(7):629-37

Lee SM, Tenney R, Wallace AW, Arjomandi M. E-cigarettes versus nicotine patches for perioperative smoking cessation: a pilot randomized trial. *PeerJ*. 2018;6:e5609

Lindson N, Butler AR, McRobbie H, Bullen C, Hajek P, Begh R, et al. Electronic cigarettes for smoking cessation. *Cochrane Database of Systematic Reviews*. 2024(1)

Myers Smith K, Phillips-Waller A, Pesola F, McRobbie H, Przulj D, Orzol M, et al. E-cigarettes versus nicotine replacement treatment as harm reduction interventions for smokers who find quitting difficult: randomized controlled trial. *Addiction*. 2022;117(1):224-33

Russell C, McKegane, Katsampouris E, Satchwell A, Haseen F. A randomised community-based trial of a closed-system pod e-vapour product and nicotine replacement therapy for cigarette abstinence and reduction [PH-353]. *Society for Research on Nicotine and Tobacco (SRNT) 2021 Annual Meeting*; Feb 24-27 2021; p. 230

Xu Y, Goldenson NI, Prakash S, Augustson EM, Shiffman S. Randomized trial assessing the effect of the JUUL system on switching away from cigarettes and smoking reduction among U.S. adults who smoke cigarettes. *Exp Clin Psychopharmacol*. 2024; 32(1): 3-15