

Electric Cigarette for Smoking Cessation: a 2019 Update Review

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Background Information

Electronic cigarette (EC), which involves the vaporization of liquid into aerosol by an electronic device for inhalation, is becoming a popular alternative to cigarette.^[1] The switch from cigarette to EC is expected to reduce health risk.^[2-3] However, due to myriad political and economic factors, the switch is not encouraged.^[4] A previous Cochrane review in 2016 showed benefit towards the use of nicotine ECs over placebo ECs for long term smoking cessation.^[5] However, owing to the poor quality of trials and lack of studies at that time, the conclusion on the comparison between nicotine ECs and nicotine replacement therapy is unknown. Given that currently nicotine replacement therapy is an effective yet popular smoking cessation method,^[1] this prospective update review is conducted in the hope that the conclusion can be drawn by incorporating the recent published trial data to the original pooled estimate from the review.

Project Objective

This prospective update review is conducted so as to:

- 01 Study** the effect of using ECs to help smokers achieve long term smoking cessation.

Materials and Methods

Review is updated by incorporating results from trials that are listed as ongoing in the Cochrane review in 2016.^[5] Search terms and selection criteria are previously reported on the Cochrane review.

Selection criteria:

- 1** Randomized controlled trials in which smokers were randomized to either EC or control condition with abstinence rate at 6 months or longer as outcome of measure.

- 2** Cohort follow-up studies with at least 6 months follow-up.

Analysing methods:

- 1** Using fixed effect Mantel-Haenszel model to calculate a risk ratio (RR) with 95% confidence interval for each randomised controlled trial and the overall estimate of RR is also pooled.

- 2** Calculating descriptive statistics on the abstinence rate from new incorporated cohort studies

Results

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Bullen 2013*	+	+	+	+	+	+	
Hajek 2019	+	+	+	+	+	+	
Halpern 2018	+	?	+	+	+	+	
Hickling 2018	?	?	+	+	+	+	
Lee 2018	+	+	+	+	+	+	

27 trials are listed as ongoing in the review which 11 (41%) are not published yet and 8 (30%) are still ongoing. 3 (11%) are excluded due to short follow-up duration and 1 (3%) excluded due to unmatched primary outcome. **4** (15%) are included in this update.

Most of the included randomized controlled trials are of **low risk of bias** after evaluation except the cohort study included. One of the reasons accounting for the high level of performance bias is due to the nature of the intervention and control being distinctive. Thus, blinding of participants are impossible as stated in most trials.

* Results from previous review^[5]

A. Comparison: Smoking cessation

1. Nicotine EC vs Nicotine replacement therapy

Study or Subgroup	Nicotine EC		NRT		Weight	Risk Ratio	
	Events	Total	Events	Total		M-H, Fixed, 95% CI	M-H, Fixed, 95% CI
Bullen 2013 *	21	289	17	295	24.8%	1.26 [0.68, 2.34]	
Hajek 2019	79	438	44	446	64.3%	1.83 [1.30, 2.58]	
Halpern 2018	11	1199	7	1588	8.9%	2.08 [0.81, 5.35]	
Lee 2018	5	20	1	10	2.0%	2.50 [0.34, 18.63]	
Total (95% CI)		1946		2339	100.0%	1.72 [1.30, 2.29]	
Total events	116		69				
Heterogeneity: Chi ² = 1.38, df = 3 (P = 0.71); I ² = 0%							
Test for overall effect: Z = 3.77 (P = 0.0002)							
* Results from previous review ^[5]							

4 studies cover **4285** patients with **52%** being female. **Smokers using nicotine EC** are more likely to abstained from cigarette smoking than smokers using nicotine replacement therapy in a long term as suggested from the pooled estimate. (RR 1.72, 95%CI 1.30, 2.29, p=0.0002; I²<1%).

B. Descriptive statistics: Update on cohort studies

Study	Smokers motivated or unmotivated to quit	Intervention vs relevant control	% Abstinent	
Cohort studies			6-month	Notes
Hickling 2018	Unmotivated to quit	Nicotine EC for 6 weeks then followed up to 24 weeks	2%	Population with mental disorder might influence result

Conclusion

Evidence have suggested that the use of nicotine ECs can **better stop smoking in a long term** when compared with nicotine replacement therapy. With proper regulation and supervision, ECs can potentially be a tool for effective smoking cessation. However, more studies are needed to evaluate the safety of EC use for smoking cessation.

References:

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