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The latest Cochrane review of electronic cigarettes for smoking cessation

Key conclusions and comparisons with existing policy

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Funded by CANCER RESEARCH UK

Funded by NHS National Institute for Health Research

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Acknowledgements and funding

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About Cochrane

WHAT?

- Gathers and combines the best evidence from research to determine the benefits and risks of treatments/interventions

HOW?

- By systematically reviewing the available evidence, with strong emphasis on quality assessment
- Cochrane methods considered gold-standard

WHY?

- To help healthcare providers, patients, carers, researchers, funders, policy makers, guideline developers improve their knowledge and make decisions

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Quitting at 6+ months

Nicotine EC versus NRT

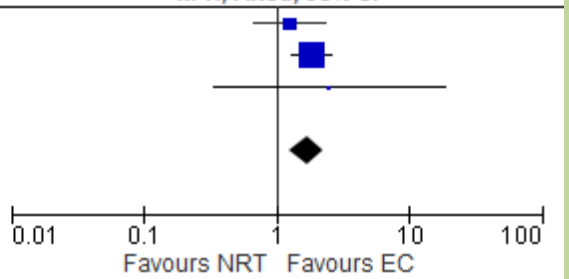
GRADE certainty of evidence: MODERATE (downgraded one level due to imprecision)

Study or Subgroup	EC Events	EC Total	NRT Events	NRT Total	Weight	Risk Ratio M-H, Fixed, 95% CI
Bullen 2013	21	289	17	295	27.2%	1.26 [0.68, 2.34]
Hajek 2019	79	438	44	446	70.6%	1.83 [1.30, 2.58]
Lee 2018	5	20	1	10	2.2%	2.50 [0.34, 18.63]
Total (95% CI)		**747**		**751**	**100.0%**	**1.69 [1.25, 2.27]**
Total events	105		62			

Heterogeneity: Chi² = 1.21, df = 2 (P = 0.55); I² = 0%

Test for overall effect: Z = 3.46 (P = 0.0005)

1.081	0.986	1.191



Quitting at 6+ months

Nicotine EC versus NRT

GRADE certainty of evidence: MODERATE (downgraded one level due to imprecision)

	EC		NRT			Risk Ratio	Risk Ratio

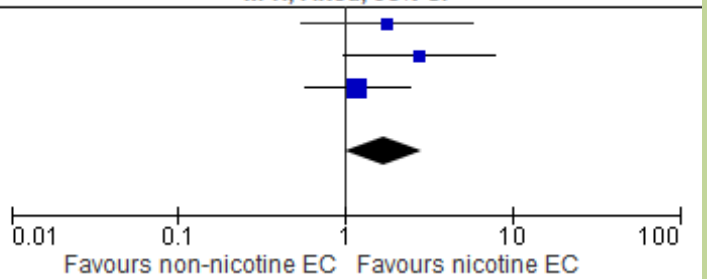
Nicotine EC versus non-nicotine EC

GRADE certainty of evidence: MODERATE (downgraded one level due to imprecision)

	Nicotine EC		Non-nicotine EC			Risk Ratio	Risk Ratio
Study or Subgroup	Events	Total	Events	Total	Weight	M-H, Fixed, 95% CI	M-H, Fixed, 95% CI
Bullen 2013	21	289	3	73	22.7%	1.77 [0.54, 5.77]	
Caponnetto 2013a	22	200	4	100	25.2%	2.75 [0.97, 7.76]	
Lucchiari 2020	13	70	11	70	52.1%	1.18 [0.57, 2.46]	
Total (95% CI)		**559**		**243**	**100.0%**	**1.71 [1.00, 2.92]**	
Total events	56		18				

Heterogeneity: Chi² = 1.79, df = 2 (P = 0.41); I² = 0%

Test for overall effect: Z = 1.97 (P = 0.05)



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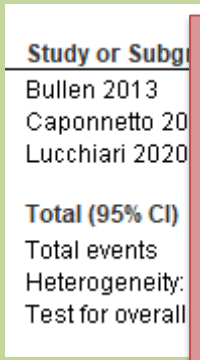
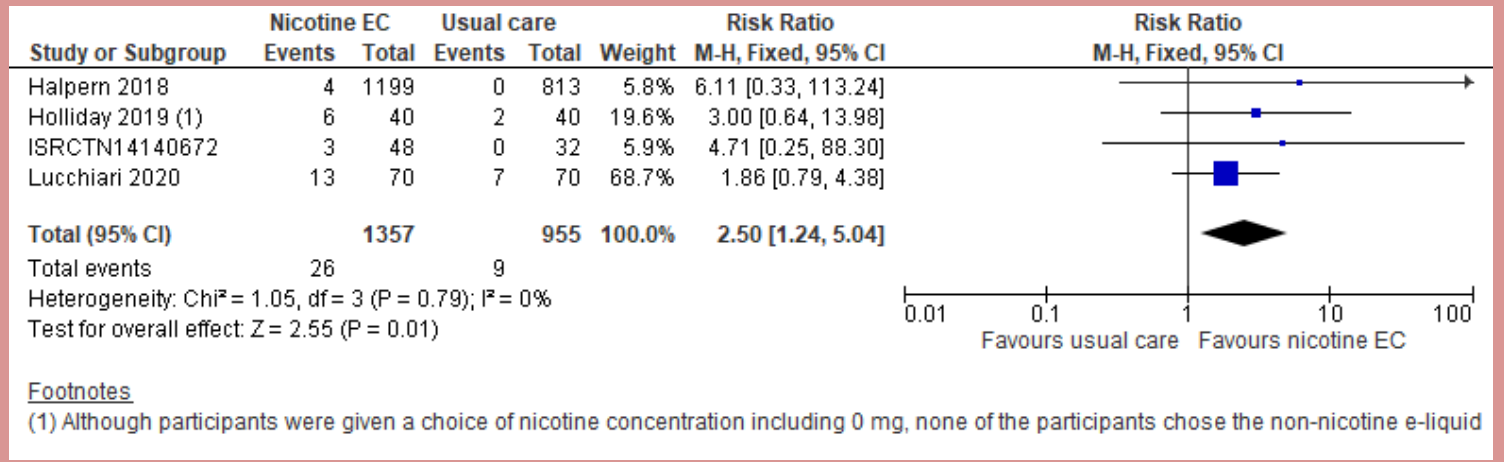


Nicotine EC versus behavioural support only/no support

GRADE certainty of e 1.081 0.986 1.191 (downgraded due to imprecision and risk of bias)

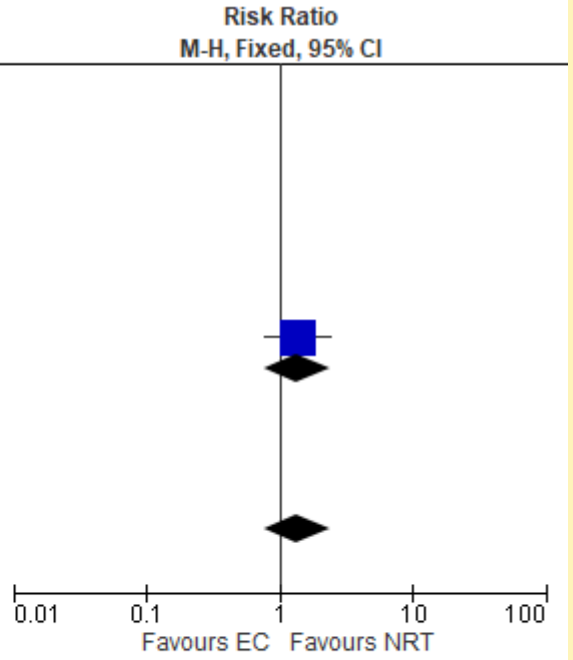


Serious adverse events at 1+week

Nicotine EC versus NRT

GRADE certainty of evidence: LOW (downgraded two levels due to imprecision)

Study or Subgroup	EC Events	EC Total	NRT Events	NRT Total	Weight	Risk Ratio M-H, Fixed, 95% CI
1.3.1 4 weeks						
Lee 2018 (1)	0	19	0	10		Not estimable
Subtotal (95% CI)		**19**		**10**		**Not estimable**
Total events	0		0			
Heterogeneity: Not applicable						
Test for overall effect: Not applicable						
1.3.2 1 year						
Hajek 2019	27	356	19	342	100.0%	1.37 [0.77, 2.41]
Subtotal (95% CI)		**356**		**342**	**100.0%**	**1.37 [0.77, 2.41]**
Total events	27		19			
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.07 (P = 0.28)						
Total (95% CI)		**375**		**352**	**100.0%**	**1.37 [0.77, 2.41]**
Total events	27		19			
Heterogeneity: Not applicable						
Test for overall effect: Z = 1.07 (P = 0.28)						
Test for subgroup differences: Not applicable						



Footnotes

(1) Data at 4 weeks post-operation; time from baseline not defined and likely to differ between participants

Serious adverse events at 1+week

Nicotine EC versus NRT

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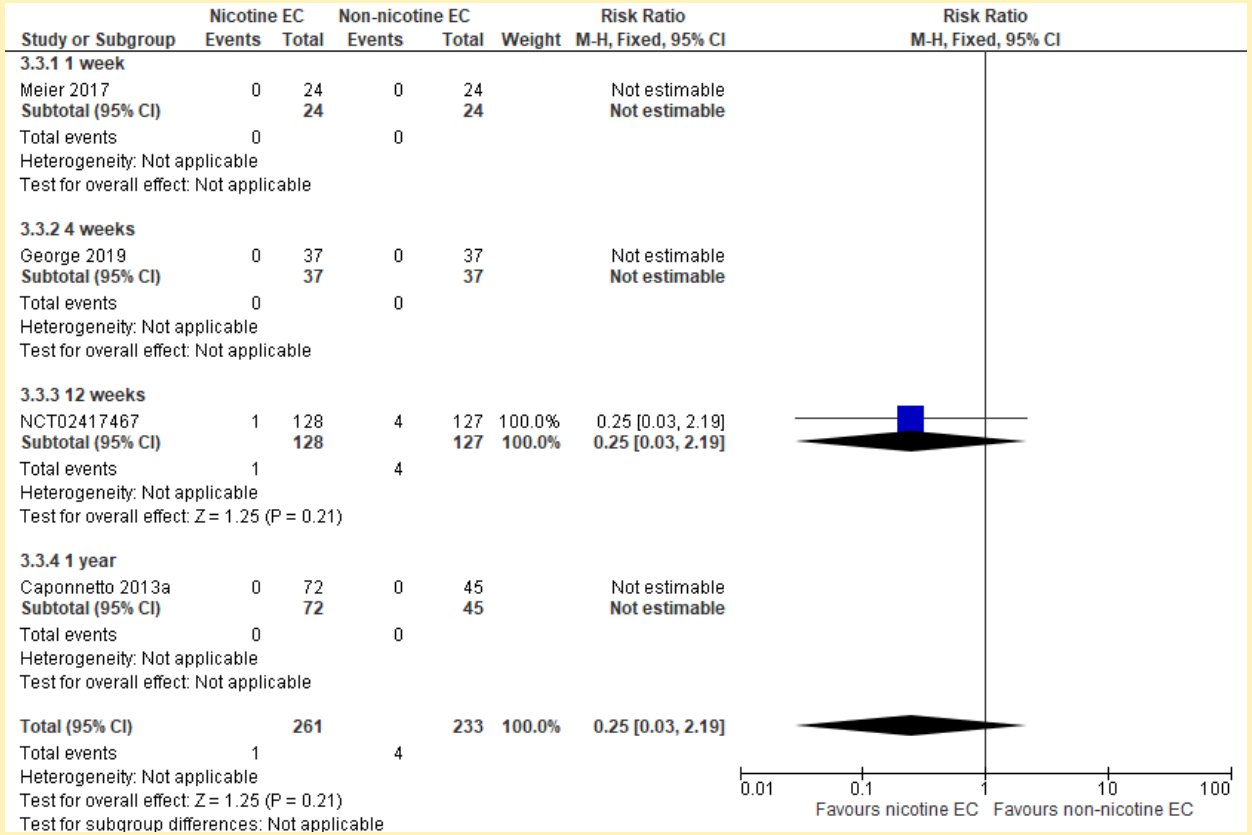
Nicotine EC versus non-nicotine EC

GRADE certainty of evidence: LOW (downgraded two levels due to imprecision)



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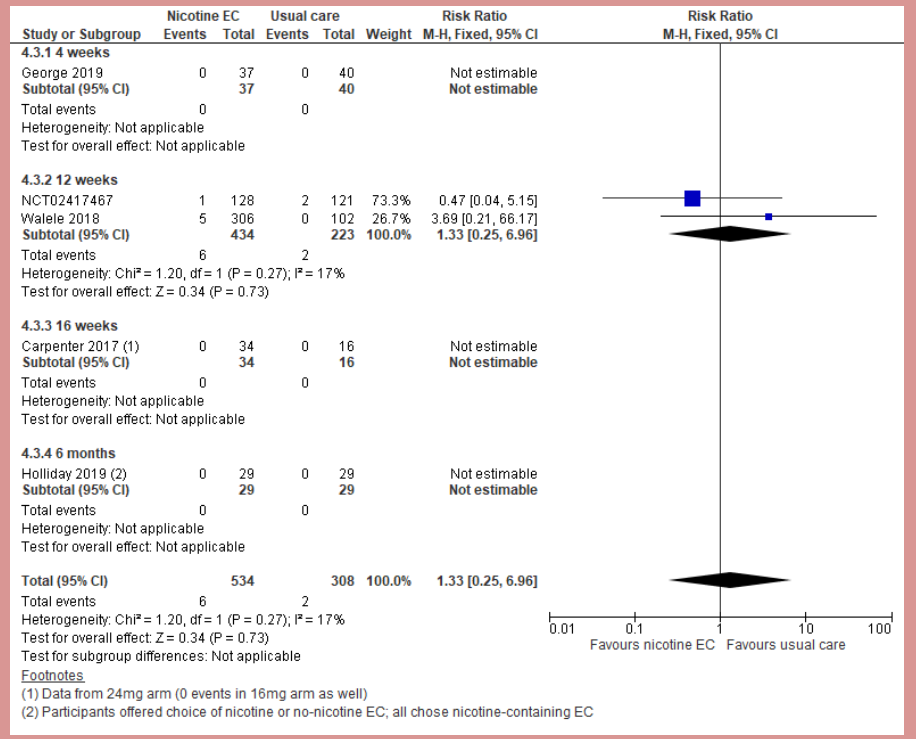
Serious adverse events at 1+week

Nicotine EC versus NRT

Nicotine EC versus non-nicotine EC

Nicotine EC versus behavioural support only/no support

GRADE certainty of evidence: VERY LOW (downgraded due to imprecision and risk of bias)



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Selected documents

Home › NICE Guidance › Lifestyle and wellbeing › Smoking and tobacco

Stop smoking interventions and services

NICE guideline

1.5 Advice or

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World Health Organization

Health Topics

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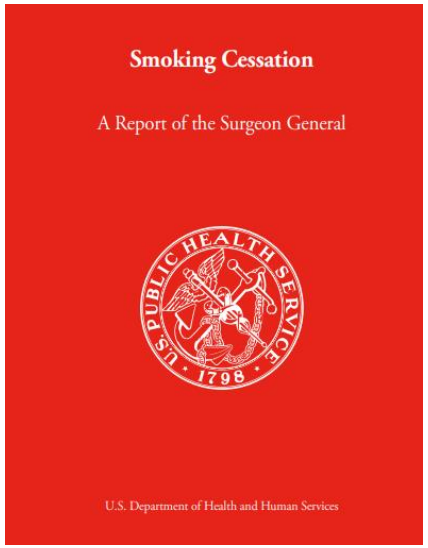
E-cigarettes

29 January 2020 | Q&A

There are many different type
Systems (ENDS), with varying
contain nicotine and other tox
vapours secondhand.



The evidence is inadequate to infer that e-cigarettes, in general, increase smoking cessation. However, the evidence is suggestive but not sufficient to infer that the use of e-cigarettes containing nicotine is associated with increased smoking cessation compared with the use of e-cigarettes not containing nicotine, and the evidence is suggestive but not sufficient to infer that more frequent use of e-cigarettes is associated with increased smoking cessation compared with less frequent use of e-cigarettes.

EC compared to…

Home › NICE Guidance › Lifestyle and wellbeing › Smoking and tobacco

Stop smoking interventions and services

NICE guideline [NG92] Published date: 28 March 2018

1.5 Advice on e-cigarettes

These recommendations are for health and social care workers in primary and community settings.

1.5.1 For people who smoke and who are using, or are interested in using, a nicotine-containing e-cigarette on general sale to quit smoking, explain that:

- although these products are not licensed medicines, they are regulated by the Tobacco and Related Products Regulations 2016
- many people have found them helpful to quit smoking cigarettes
- people using e-cigarettes should stop smoking tobacco completely, because any smoking is harmful
- the evidence[4] suggests that e-cigarettes are substantially less harmful to health than smoking but are not risk free
- the evidence in this area is still developing, including evidence on the long-term health impact. **[2018]**

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EC compared to…

Home › NICE Guidance › Lifestyle and wellbeing › Smoking and tobacco

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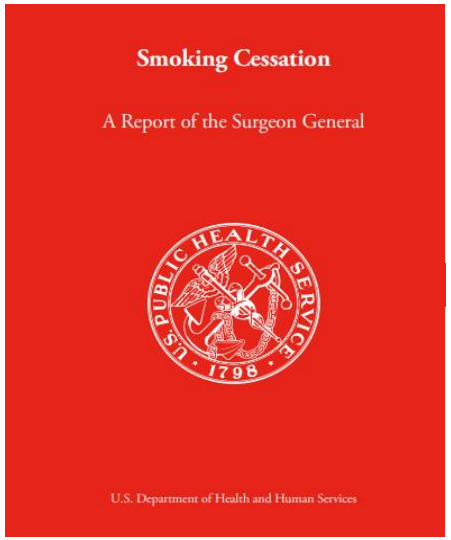

However, when considering e-cigarettes as a potential cessation aid for adult smokers, it is also important to take into account factors related to both safety and efficacy. NRT has been proven safe and effective, but there is no safe tobacco product. Although e-cigarette aerosol generally contains fewer toxic chemicals than conventional cigarette smoke, all tobacco products, including e-cigarettes, carry risks.

2015; Warner and Mendez 2019). E-cigarette aerosol has been shown to contain markedly lower levels of harmful constituents than conventional cigarette smoke (National Academies of Sciences, Engineering, and Medicine 2018). Accordingly, interest remains in policies and approaches that could maximize potential benefits of these devices while minimizing potential pitfalls posed by the devices at the individual and population levels, including concerns about initiation among young people. The 2016 Surgeon

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Home › NICE Guidance ›

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World Health Organization | Health Topics | Countries | Newsroom

Are e-cigarettes more or less dangerous than conventional tobacco cigarettes?

It is difficult to generalize on the risk to health of ENDS as compared with cigarettes or other tobacco products, as this is contingent on a range of factors.

Both tobacco products and ENDS pose risks to health. The safest approach is not to use either.

The levels of risk associated with using ENDS and/or tobacco products are likely to depend on a range of factors, some relating to the products used and some to the individual user. Factors include: product type and characteristics, how the products are used, including frequency of use, how the products are manufactured, who is using the product, and whether product characteristics are manipulated post-sale.

Toxicity is not the only factor in considering risk to an individual or a population from exposure to ENDS emissions. These factors may include the potential for abusing or manipulating the product, use by children and adolescents who otherwise would not have used cigarettes, simultaneous use with other tobacco products (dual or poly use) and children and adolescents going on to use smoked products following experimentation with ENDS. Further, not all ENDS are the same and the risks to health may differ from one product to another, and from user to user.

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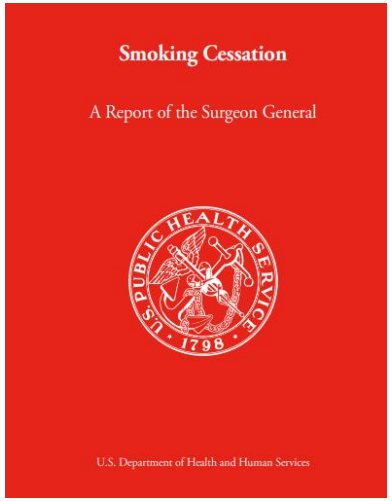
Cessation vs. uptake



Therefore, it is important to continue (a) monitoring the findings of research on the potential of e-cigarettes as a smoking cessation aid and (b) evaluating the positive and negative impacts that these products could have at the individual and population levels, so as to ensure that any potential benefits among adult smokers are not offset at the population level by the already marked increases in the use of these products by youth. It is particularly important to evaluate scientific evidence on the impact of e-cigarettes on adult smoking cessation in the current context of the high level of e-cigarette use by youth, which increased at unprecedented levels in recent years following the introduction of JUUL and other e-cigarettes shaped like USB flash drives (Cullen et al. 2019).

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National Institute for Health and Care Excellence

Guideline version (Final)

Smoking cessation interventions and services

[C] Evidence reviews for advice on e-cigarettes on general sale

NICE guideline NG92

Evidence reviews

[March 2018]

Interpreting the evidence

The outcomes that matter most

The committee agreed that quit rate was the most important outcome as it was a reliable proxy for all the benefits accrued after a smoker quits. This includes the reduction in risk to tobacco-related illnesses and the morbidity and mortality associated with these. For people with tobacco-related illness there is an increased benefit in terms of greater risk reduction, lessening of symptoms, fewer hospital admissions etc.

For people with other medical conditions, stopping smoking can reduce the risk of complications associated with those conditions, increase treatment options (for example in HIV), and reduce delays in recovery after surgery

From a population health aspect the committee noted that one of the largest risk factors for starting smoking is having a parent who smokes so any increase in quit rates will have a carry-on benefit in terms of further reducing the number of people who take up smoking. There is an additional benefit from reduced exposure to second-hand smoke.

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Conceptualising uncertainty

World Health Organization | Health Topics | Countries | Newsroom | Emergencies

Are secondhand ENDS emissions dangerous? ⊕

What are the policy options for regulating ENDS? ⊕

What role do ENDS play in smoking cessation? ⊖

The scientific evidence regarding the effectiveness of ENDS as a smoking cessation aid is still being debated. To date, in part due to the diversity of ENDS products and the low certainty surrounding many studies, the potential for ENDS to play a role as a population-level tobacco cessation intervention is unclear.

To truly help tobacco users quit and to strengthen global tobacco control, governments need to scale up policies and interventions that we know work. Tried and tested interventions, such as brief advice from health professionals, national toll free quit lines and cessation interventions delivered via mobile text messaging is recommended. Where economically feasible, governments should also consider promoting nicotine replacement therapies and non-nicotine pharmacotherapies for cessation.

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Conceptualising uncertainty

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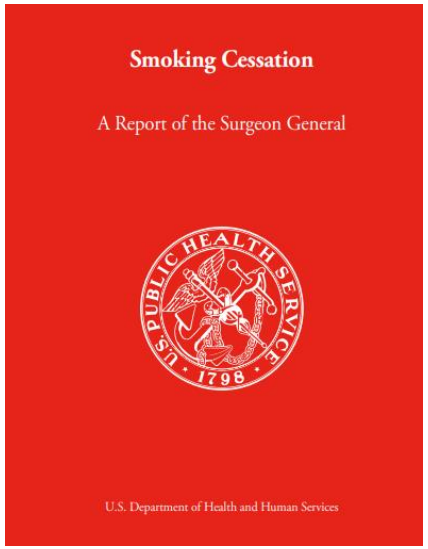

As noted previously, some of the literature suggests potential utility of e-cigarettes for smoking cessation. However, the current literature is limited by small numbers of trials, low event rates, and wide confidence intervals. Moreover, interpretation of results is further complicated by the wide variation in e-cigarette products (i.e., types of devices and components and levels of nicotine content in e-liquids) and the contexts in which they are used, including the motivation of smokers to quit and whether the products are used with behavioral support. Accordingly, more well-designed RCTs and prospective observational studies are needed to determine whether and how e-cigarettes influence smoking cessation, including whether the type of e-cigarette and the setting in which it is used impacts the potential for e-cigarette use to help smokers quit.

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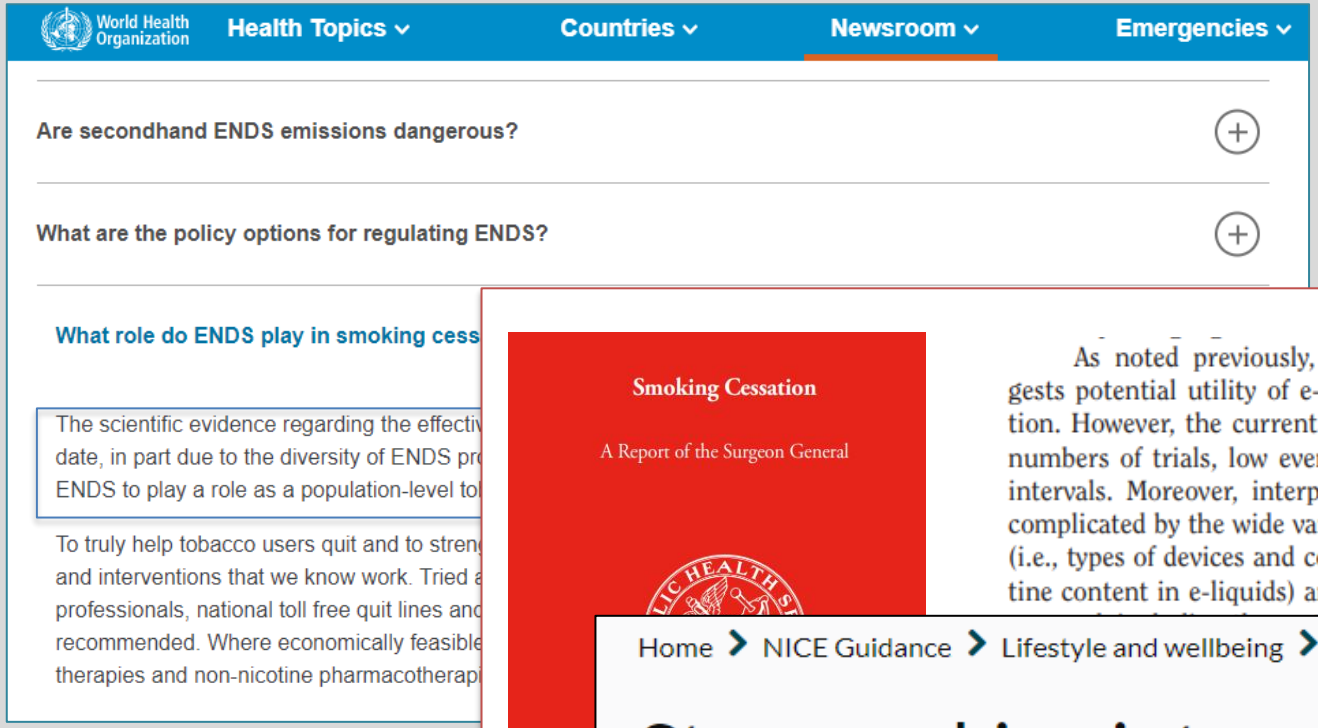
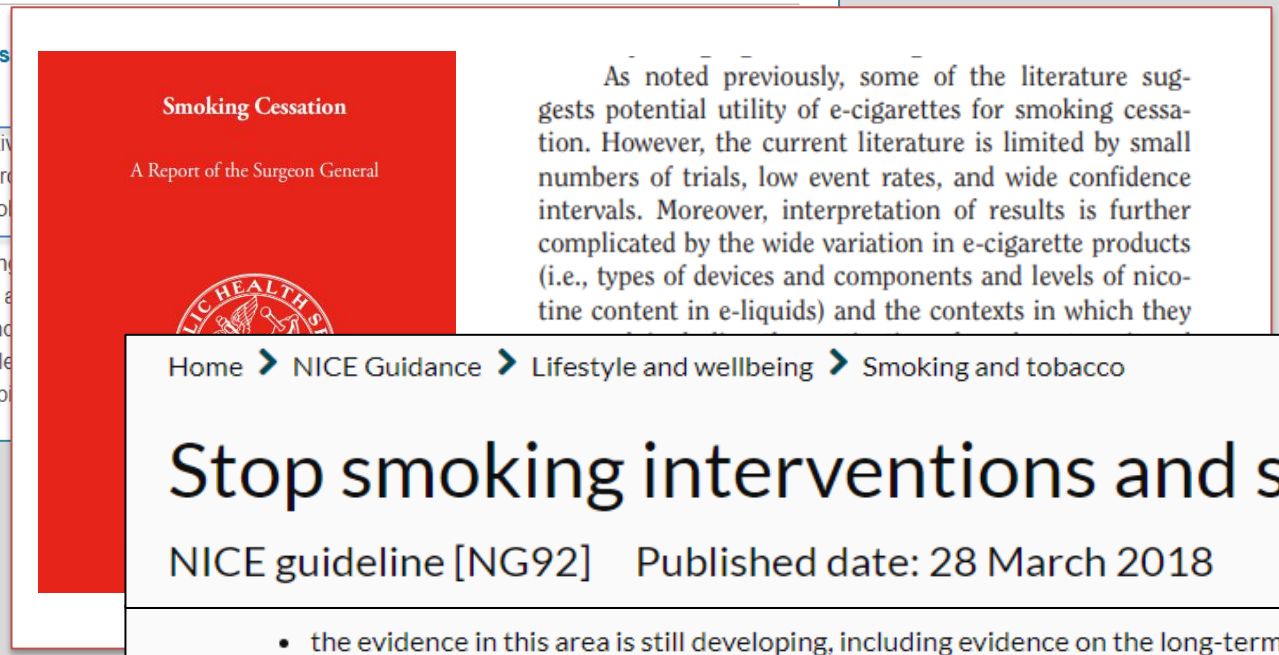
Conceptualising uncertainty





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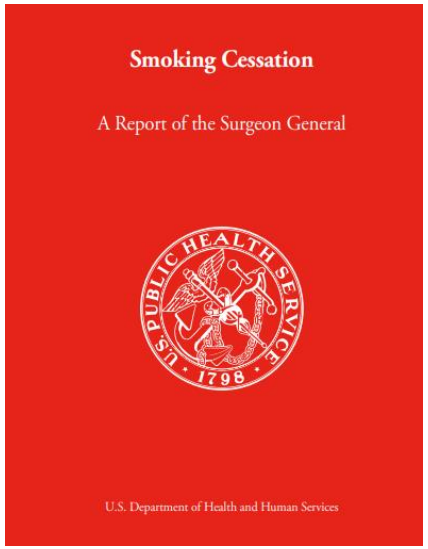
How up to date is the evidence?



Few RCTs have been conducted that directly investigate the utility of e-cigarettes for smoking cessation, and no RCTs on this topic have been conducted in the United States. Only four RCTs—a clinical trial of smokers in Italy who were not motivated to quit (Caponnetto et al. 2013), a clinical trial of smokers in New Zealand who were motivated to quit (Bullen et al. 2013), another clinical trial of smokers in New Zealand who were motivated to quit (Walker et al. 2019), and an RCT of adults using the stop-smoking service of the UK National Health Service (Hajek et al. 2019)—have directly tested the efficacy of using e-cigarettes for smoking cessation with a follow-up [illegible] months; none were funded by th[illegible]e industries. In a randomized

12 of which contributed to cessation meta-analyses

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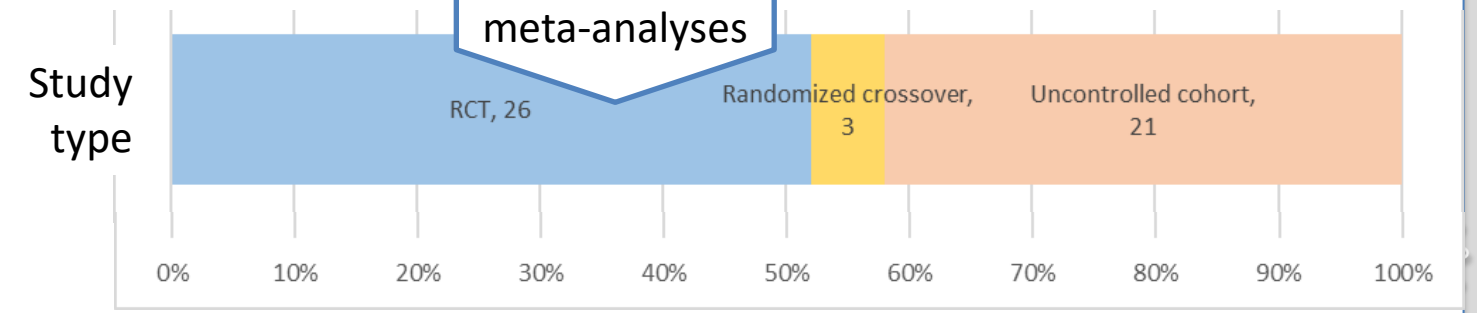

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From this month, we will be…

- Searching the evidence monthly
- Posting new studies monthly
- Updating the review when we find studies that might change, strengthen, or weaken our conclusions
- Sharing our findings – via briefing documents and podcasts

For the latest on the above, go to: https://www.cebm.ox.ac.uk/research/electronic-cigarettes-for-smoking-cessation-cochrane-living-systematic-review-1