



Evidence Snapshot

**Clinical
interventions
for e-cigarette
cessation in
young people**

An Evidence Snapshot brokered by the Sax Institute for the NSW Ministry of Health
December 2022.

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Disclaimer:

This Evidence Snapshot was produced using the Evidence Snapshot methodology in response to specific questions from the commissioning agency.

It is not necessarily a comprehensive review of all literature relating to the topic area. It was current at the time of production (but not necessarily at the time of publication). It is reproduced for general information and third parties rely upon it at their own risk.

Introduction

An Evidence Snapshot is a rapid review of existing evidence which answers one specific policy or program question and is presented as a short brief summarising existing evidence. Evidence Snapshots review up to 20 papers which may be peer reviewed or grey literature reports, focusing on literature published in last two years, identified using limited databases and search terms. Given the limited amount of literature available on this particular topic, the search specification was extended to literature published in the last eight years.

This Evidence Snapshot is intended to inform the re-development of *'Managing Nicotine Dependence: A guide for NSW Health staff'* to include a new section to support clinicians to manage e-cigarette dependence in young people. *'Managing Nicotine Dependence: A guide for NSW Health staff'* was developed in 2015 and supports NSW Health staff to provide effective, evidence-based treatments for nicotine dependent clients, including brief interventions for smoking cessation.

E-cigarette use is rapidly rising in NSW and there is increasing evidence on the harms of e-cigarette use. There is also evidence to suggest that e-cigarette users are three times as likely to take up smoking. The highest prevalence of e-cigarette use in NSW are young people between the ages of 12 and 24 years.

While a rigorous search process was followed, given this is an emerging field of research it is likely that new studies will be published as this snapshot is disseminated, and there may be a great deal of change as the collective knowledge base in this area develops. To this end, the primary goal of this snapshot is to summarise the extant e-cigarette cessation literature as it pertains to young people, including their attitudes toward e-cigarette cessation, to inform evolving clinical approaches to cessation strategies in NSW.

Review question

For young people aged 12-24 years, what clinical interventions have been shown to be effective in managing e-cigarette (vaping) cessation?

Methods

We searched the journal databases Medline, CINAHL, and Scopus, and Google Scholar. Searches were conducted from 1st to 8th November 2022. We also added a small number of papers (n=2) found via other means, for a total of 243 papers (after removal of duplicates).

After title and abstract review, 29 papers remained, and after consultation with the Ministry of Health 21 papers in total were included. A summary of the key findings is presented in the next section, with full results reported in Appendices 1 and 2.

Inclusion and exclusion criteria

This is an emerging area of research, so we expected that literature on the topic would be limited. As such, we endeavoured to be as inclusive as possible for any relevant studies. We limited our search to relevant peer-reviewed literature that addressed a clinically relevant e-cigarette cessation intervention or strategy, or reviewed the implementation of e-cigarette cessation interventions, or attitudes of young people (aged 12-24) to quitting e-cigarettes. Where nicotine was the main clinical target of the cessation intervention, the source had to be from an e-cigarette (also referred to as vaping throughout this report) as the primary mode of delivery, while acknowledging that users are often dual users of both e-cigarettes and combustible cigarettes. Due to the limited amount of literature available, we included studies without control or comparison groups, including longitudinal studies, cross-sectional studies, case series and case studies. We also included systematic reviews, narrative reviews, or editorials where there was a focus on cessation strategies informing emergent clinical practice or guidelines. We included studies set in English-speaking countries with similar healthcare systems to Australia's: Australia, NZ, the UK, the US and Canada.

We **excluded** studies set outside clinical settings, such as schools and population-level health programs. We excluded studies focussed on regulatory or policy measures. We excluded studies which only sampled populations other than young people. We excluded studies focussed on combustible cigarette cessation and those which examined e-cigarette use as an adjunct to this cessation process. We excluded studies which did not test the efficacy of interventions or attitudes towards cessation, which examined dependency measures or factors influencing cessation, and protocol papers.

Finally, we included studies identified as relevant by the Ministry of Health upon their review of our list of suggested inclusions.

Summary of findings

Findings

We identified 21 papers which met our inclusion criteria (n=5 were reviews, n=2 were commentaries, n=7 were intervention studies, n=5 were studies concerned with motivations to quit or different modes of cessation strategies, and n=2 were outliers and included for contextual reasons).

We found very few studies analysing the effectiveness of e-cigarette cessation interventions in a clinical setting. Of those we reviewed, e-cigarette tapering and nicotine replacement therapy in conjunction with behavioural counselling appeared to be the most effective clinical interventions. There is also strong evidence that digital cessation interventions may be the preferred mode of delivery by young people, however there are limitations concerning the development of these types of interventions in the clinical context and understanding their effectiveness in maintaining abstinence is yet to be demonstrated. It warrants noting that all identified studies conducted on e-cigarette cessation interventions were based in the United States which has a very different legal context from the Australian/ NSW context.

This snapshot has focussed on papers looking at specific interventions that may be applicable to e-cigarette cessation in a clinical setting (both non-pharmacologic and pharmacologic), studies concerned with young people's interest in and methods of e-cigarette cessation, and e-cigarette cessation reviews and commentaries. In extracting data from these discussion papers, we focussed on their conclusions concerned with cessation interventions that were applicable in a clinical setting, interest in e-cigarette cessation and what methods appealed most to young people (aged 12-24) for cessation of e-cigarette use.

Clinical Interventions

Six studies looked at clinical interventions for e-cigarette cessation. All the papers were from studies conducted in the United States. Cessation interventions identified included nonpharmacologic interventions such as contingency management (Palmer et al., 2022; Raiff, Newman, Upton, & Burrows, 2021), behavioural counselling (Sikka, Oluyinka, Schreiber, & Galiatsatos, 2021; Silver, Ripley-Moffitt, Greyber, & Goldstein, 2016), e-cigarette nicotine tapering (Sahr, Kelsh, Blower, & Sohn, 2021; Sahr, Kelsh, & Blower, 2020) and nicotine replacement therapy (NRT) (Sahr et al., 2021; Sikka et al., 2021). Nicotine tapering and NRT were the only pharmacologic interventions studied in young adults (aged 18-24) in conjunction with behavioural counselling (Sahr et al., 2021; Sikka et al., 2021). It should be noted that the evidence is of low quality due to under-powered studies, non-experimental methodologies, and in some cases high dropout rates.

Nonpharmacologic interventions

Two studies assessed the effectiveness of contingency management in e-cigarette cessation (incentives for achieving and maintaining abstinence). Both studies were pilot studies with small sample sizes and brief interventions; one had eight college students over a two-week intervention (Raiff et al., 2021), and the other had 27 young adults aged 17-21 over a four-week intervention period (Palmer et al., 2022). Both are very low-quality studies but have been included due to a paucity of studies available to assess. Noting the low quality of these studies, both found a high rate of success in achieving abstinence (between 100% and 55%) when participants were incentivised with financial rewards.

Behavioural counselling was often used in conjunction with either e-cigarette nicotine tapering (or vape-tapering) or NRT interventions, so there is no evidence for its effectiveness as a stand-alone intervention, only evidence for its effectiveness as part of a combined intervention. Two studies reviewed the effectiveness of e-cigarette nicotine tapering in conjunction with behavioural counselling. The first paper was an RCT with 24 participants (aged 18-24), of which eight were allocated to the vape-taper group. E-cigarette nicotine tapering decreased the amount of nicotine consumed by reducing the concentration and frequency over time in conjunction with behavioural support (Sahr et al., 2021). Noting the limitations of this study due to small sample size, participants who received behavioural support and a vape-taper plan were more likely to be vape-free and nicotine-free at six months. The second paper was a case study of a single participant who quit vaping after 12 weeks following an intervention delivered by pharmacist combining e-cigarette use taper and behavioural counselling (motivational interviewing) (Sahr et al., 2020). Neither of these studies have good generalisability to the broader population given their small sample sizes.

Pharmacologic interventions

Nicotine replacement therapy (NRT) was the only pharmacologic intervention that had been tested in young adults (aged 18-24). Three papers were identified; one was an RCT (n=7) (Sahr et al., 2021), one a case series (n=6) (Sikka et al., 2021) and one a case study (n=1) (Silver et al., 2016).

NRT was provided in different delivery modalities (patches, gum, lozenges and nasal spray) based on the participant's personal preference and was combined with counselling services delivered over 12 weeks (Sahr et al., 2021; Silver et al., 2016), or 12 months (Sikka et al., 2021). Three participants out of six in the case series had quit after six months and remained abstinent, while two participants out of seven in the RCT who quit after the 12-week program remained abstinent after six months. The sole participant in the case study quit e-cigarettes before the 12-week program was complete, used NRT intermittently over the following six months, and was abstinent at the 12-month follow-up (Silver et al., 2016).

While the RCT and case series had higher power than the case study, due to slightly larger sample sizes, all of these studies are very low powered and would need to be replicated for confidence in the generalisability of the findings. As such, it is not possible to draw any firm conclusions from these studies.

Table 1: Summary of clinical interventions for e-cigarette cessation identified in the literature, their success in achieving abstinence (%), intervention period, study method, and sample size

Cessation intervention	Success (%) and intervention period	Study methods	Sample size	Studies referenced
<i>Nonpharmacologic</i>				
Contingency management <i>(Incentivising/ rewarding abstinence)</i>	Abstinent at end of intervention: Median: 79.6 (range: 59.1-100%) Period: 2-4 weeks	Pilot trial and pilot RCT feasibility study	n=8-27	(Palmer, 2022; Raiff, 2021)
Behavioural counselling <i>(e.g. Cognitive Behavioural Therapy - CBT)</i>	Abstinent at end of intervention: Median: 75 (range: 50-100%) Period: 12 weeks – 12 months)	Case series, case study	n=1-6	(Sikka et al., 2021; Silver et al., 2016)
E-cigarette nicotine tapering <i>(measured reduction in nicotine consumption)</i>	Abstinent at end of intervention: Median: 87.5 (range: 75-100%) Period: 12 weeks – 6 months	RCT and case study	n=1-24	(Sahr et al., 2021; Sahr et al., 2020)
<i>Pharmacologic</i>				
Nicotine Replacement Therapy (NRT) <i>(controlled slow-release nicotine delivery without tobacco)</i>	Abstinent at end of intervention: Median: 50 (range 42.9-100%) Period: 12 weeks – 12 months	RCT, case series and case study	n=1-24	(Sahr et al., 2021; Sikka et al., 2021; Silver et al., 2016)

NB some studies used multimodal interventions or had more than one treatment group and so appear in more than one row of the table (e.g. Sikka et al., 2021 used counselling in conjunction with NRT; Sahr et al., 2021 had two treatment groups).

Digital platforms as a mode of intervention delivery

Digital platforms were recommended as mode of delivery for cessation interventions that appeal to young people in a review by Liu et al (Liu, Gaiha, & Halpern-Felsher, 2020). However, only one included study assessed the effectiveness of the use of a digital platform on the delivery of an e-cigarette cessation intervention (use of motivational text messages). A randomised controlled trial (RCT) by Graham et al (2021) with 2,588 participants found a statistically significant difference in abstinence rates between participants assigned to the text message intervention (24.1%) and participants assigned to the assessment-only control group (18.6%) seven months post-randomisation (Graham et al., 2021). While the study method used (RCT) is very strong and they had a large sample size, any findings would need to be replicated for appropriate confidence in these outcomes. There is a need for more of these kinds of interventions to be tested.

Interest and appeal of interventions for e-cigarette cessation to young people

Six papers focussed on attitudes of young people to e-cigarette cessation interventions (Amato, 2021; Berg, 2021; Berg, 2021; Garey, 2021; Sanchez, 2021; Dyson, 2022). Five studies used qualitative methods (four were conducted in the US and one in Canada) and one was a review of the barriers, facilitators and support needed for e-cigarette cessation (Dyson, Bhatnagar, Skinner, & Crooks, 2022). The review by Dyson et al (2022) included studies with both adolescent/ young adult and adult populations. Where possible the findings most relevant to young people were included in this review.

Common themes were the appeal and willingness to use technology-based interventions for young people (Berg, Romm, Patterson, Wysota, & Abrams, 2021; Garey, Scott-Sheldon, Olofsson, Nelson, & Japuntich, 2021). Health risks were most frequently identified as facilitators for quitting (Amato et al., 2021; Dyson et al., 2022; Garey et al., 2021) followed by costs and addiction (Amato et al., 2021; Garey et al., 2021; Sanchez et al., 2021). Sanchez et al. (2021) identified perceived social acceptability of vaping and lack of information on health risks as key differences in barriers to quitting vaping compared to quitting smoking. Other barriers identified included social benefits (time spent with friends and new connections), stress reduction, sensory and behavioural gratification (Dyson et al., 2022; Sanchez et al., 2021). Enjoyment of flavours and convenience (lack of smell, ability to vape in more places) were also identified as barriers to cessation (Sanchez et al., 2021).

The paper by Berg et al (2021) looked at the preferred tobacco/ e-cigarette cessation approaches for young adults (18-34). They found that the most frequently endorsed intervention was nicotine replacement therapy (73%), followed by technology-based programs (70%) and oral cessation medications (53%). The most frequently endorsed type of technology-based approach was smartphone apps (85.9%) and text-messaging services (62%).

A cross-sectional survey of young e-cigarette users in the US by Hughes et al reported that only a minority experienced withdrawal symptoms and fewer reported withdrawal symptoms than tobacco users (Hughes & Callas, 2019). Despite the small sample size (n=25), the infrequent reporting of withdrawal symptoms is a potentially important consideration in the development of cessation strategies. A cross-sectional survey of healthcare providers by Pepper et al (2014) found high levels of awareness of e-cigarettes (92%), however only 11% had treated an adolescent who had used e-cigarettes (Pepper, McRee, & Gilkey, 2014). This study found that there was a need to raise awareness among healthcare providers and practitioners.

None of the qualitative studies included were generalisable, due to the sampling methods used.

Review papers

We identified four review papers and two commentaries that synthesised the literature on e-cigarette cessation interventions. Many of the papers compensated for the lack of e-cigarette cessation intervention studies specific to adolescents either with adult studies, or by drawing parallels to combustible cigarette interventions that have proven effective in the adolescent population.

Liu et al. (2020) found a number of e-cigarette prevention and cessation programs targeting young children and adolescents in the US that had not been published in the peer-reviewed literature. They identified eight e-cigarette cessation programs for adolescents in the US; three were text-message based, two were school-based, two were alternative-to-suspension strategies and one was a Quitline. Only the Quitline and the text-message based service (without counsellor support) had been

evaluated. Liu et al. suggested that alternative-to-suspension strategies in schools appeared to be an effective method when delivered by a professional educator (Liu et al., 2020); evaluations showed that youth engaged with the program content and it was successful in motivating adolescents to quit e-cigarettes. However, it is important to assess the motivations for enrolling in such programs (primarily to avoid suspension) which can lead to strong bias in these studies. Another noted limitation of these programs is that they were not regularly revised to include the latest products that youth are using such as newer disposables (Liu et al., 2020). As the papers in the Liu review had not been peer reviewed, we cannot provide a formal rating of their potential effectiveness or generalisability beyond the school setting in the US.

Commentaries such as the US Preventive Services Task Force's commissioned update to their review of evidence for e-cigarette prevention and cessation strategies found that the evidence for behavioural counselling was inadequate, but stated that the risk of harm was low given the non-invasive nature of the interventions (Owens et al., 2020). Slightly outside the scope of this review (as the findings are specific to combustible cigarettes), but relevant to this intervention, a Cochrane review examined the long-term effectiveness of behavioural counselling as a smoking cessation intervention for adolescents. They found that there was no clear evidence that these interventions were effective for cessation in the adolescent population (Fanshawe et al., 2017).

One issue raised by Adams et al. (2021) of particular clinical significance was the need to be able to create a consistent measure or validated units of nicotine intake to inform treatment decisions – especially as they would relate to NRT. This is due to the largely unregulated production of e-cigarettes that may have variations across device brands in the cartridge nicotine concentration (Adams et al., 2021).

The reviews all suggested there were current gaps in our knowledge and a need for further research. These included the need to separate out e-cigarette research from general tobacco prevention (Liu et al., 2020), to obtain more adequately powered studies (especially RCTs) on a larger scale (Adams et al., 2021; Gaiha & Halpern-Felsher, 2021), and to investigate the accessibility and interactive ability of digital interventions (Berg, Krishnan, Graham, & Abrams, 2021; Liu et al., 2020).

Key messages

- We found that there are limited studies analysing the effectiveness of e-cigarette cessation interventions in a clinical setting and of those that do exist the sample sizes are small, and the studies are underpowered to make any confident assessment of their effectiveness.
- Clinical interventions appropriate for young people included nonpharmacologic interventions such as contingency management and behavioural counselling while NRT may be an effective pharmacologic intervention.
- There was limited evidence to demonstrate the effectiveness of behavioural counselling as a stand-alone cessation strategy, but it may be effective in conjunction with other approaches.
- Emerging evidence suggests that digital cessation interventions (i.e. text message or app-based delivery) may be the preferred mode of delivery for young people, however, their effectiveness in maintaining abstinence is yet to be confirmed.
- Evidence suggests there is a need to quantify and create a consistent measure of nicotine intake to appropriately inform clinical treatment decisions.
- Studies are generally very low quality, and it is not possible nor is it appropriate to make any definitive conclusions.

Table 2 — Data extraction table: peer-reviewed literature assessing the effectiveness of specific e-cigarette cessation interventions

Author, Year (Country)	Study design	Setting	Sample	Intervention(s)	Measures of effect	Results/Outcomes
Graham et al., 2021 (US)	RCT	Digital	Young adults (aged 18-24) who had used e-cigarettes in the past 30 days n=2,588 Control group n=1,284	Text message intervention program	Self-reported abstinence	Statistically significant difference in abstinence rates between participants assigned to the text message intervention (24.1%) and participants assigned to the assessment only control (18.6%) seven months post-randomisation
Palmer et al., 2022 (US)	RCT but conducted as a feasibility and acceptability trial (underpowered for efficacy and imbalanced treatment and control groups).	Digital	Young adults: n=27 aged 17-21. Only one person was under 18. 18 of 27 participants were female and 24 of 27 white.	Four-week contingency management programme. There were weekly phone calls and cotinine samples were collected 3-4 times per week over the quit period Delivered by smartphone app (DynamCare Health).	Cotinine and self-reported abstinence	The treatment group's samples were 55% abstinent compared to the control group's 8% abstinent, over the cotinine samples collected during treatment. However, at end of treatment in Week 4 (59.1% for treatment group and 40% for controls) and at follow-up in Week 8, there were no significant differences in terms of abstinence.
Raiff et al., 2021 (US)	Pilot trial (no control)	Digital	Young adults: n=8 aged 18-22 (study design specified 18-35 as acceptable age range)	Two-week contingency management	Cotinine and self-reported abstinence	All participants attended their telemedicine calls and quit vaping during the intervention
Sahr et al., 2021 (US)	RCT	F2F and Phone	n=24 young adult college students. Mean ages for the three groups were from 19 to	Three different intervention groups delivered by pharmacists over a 12-week treatment duration:	Cotinine and self-reported abstinence	Vape-taper was found to be most effective - 75% of participants remained abstinent at six months

Author, Year (Country)	Study design	Setting	Sample	Intervention(s)	Measures of effect	Results/Outcomes
			23; 17 out of 24 (71%) were male.	1. Nicotine replacement therapy (NRT) + behavioural support OR 2. Vape-taper plan + behavioural support OR 3. Self-guided (control condition)		versus 42.9% of the NRT and 44.5% of the self-guided groups
Sahr et al., 2020 (US)	Case study	F2F	n=1; the case was a 23-year-old male.	Intervention delivered by pharmacist: ENDS use taper and behavioural counselling (motivational interviewing). After the initial appointment there were further appointments at five days, then every two weeks from the 4th week to the 12th week inclusive, with face-to-face and phone meetings alternating.	Cotinine	The patient quit vaping after 12 weeks. At six-month follow-up he still was not vaping (though he had "slipped up" a few times while drinking.)
Sikka et al., 2021 (US)	Case series	F2F and Phone	Daily e-cig users. n=6; mean age 23.0 (SD 5.1, range 17-31); 4 of 6 male; 5 of 6 white. Mean duration of daily e-cig use 4.17 yrs. (SD 1.94, range 1-6); mean pods used per month 3.0 (SD 1.55, range 1-5).	Counselling every two weeks with sessions of up to 30 minutes, plus NRT in different delivery modalities (patches, gum, lozenges and nasal spray). Duration up to 12 months (some patients did not require that long to quit).	Self-report	Three of six patients had quit e-cigarettes by six months, one more patient quit after eight months. The two patients who had not quit by the six-month mark did reduce their usage by the twelve-month mark.

Author, Year (Country)	Study design	Setting	Sample	Intervention(s)	Measures of effect	Results/Outcomes
Silver et al., 2016 (US)	Case study	F2F	n=1; the case was a 24-year-old Caucasian male.	Nicotine replacement therapy (NRT) and behavioural counselling.	Not specified	Successfully abstinent at 12-month follow-up (treatment was 12 weeks' duration).

Table 3 —Data extraction table: peer-reviewed literature assessing the appeal of specific e-cigarette intervention types in young adult populations

Author, Year (Country)	Study design	Setting and population	Intervention type	Main outcomes
Berg, 2021, (US)	Longitudinal cohort study	Self-reported survey (n=483) youth aged 18–34 years	Study examined appeal of behavioural interventions (technology based or in person counselling); pharmacotherapy (nicotine replacement therapy or oral medications) and types of technology-based approaches (text, apps).	The most frequently endorsed intervention was nicotine replacement therapy (72.7%), followed by technology-based programs (70.0%) and oral cessation medications (53.0%). The most frequently endorsed type of technology-based approach was smartphone apps (85.9%).
Sanchez, 2021, (Canada)	Qualitative study	F2F (n=41) youth aged 16–29 years	Study examined perceived similarities and differences in barriers to quitting and similarities and difference in reasons for quitting between smoking and vaping.	Perceived similarities were social benefits (time spent with friends and new connections), stress reduction, sensory and behavioural gratification. Perceived differences were enjoyment of flavours, convenience and discreetness (lack of a distinct smell, lack of self-awareness of vaping behaviours (unaware of how much is being used). Key differences were perceived social acceptability of vaping, levels of certainty with regard to the health effects of vaping, and levels of awareness of vaping behaviour.
Garey, 2021, (US)	Cross-sectional survey	Digital (n=212) adolescents and young adults aged 14- 21 years	Study examined interest in quitting e-cigarettes, cessation attempts, willingness to use cessation treatments (digital, medication).	Reported willingness to use web-based self-help materials (57.8%), videos on quitting (51.9%), and an app-based program (50.9%). Participants reported they were most willing to use an app (22.3%), web-based self-help materials (19.4%), and medication (14.7%).
Amato, 2021, (US)	Qualitative study	Digital (n=2,000) youth 13–24 years	Study examined motivations for quitting	Common reasons reported were health (50.9%), financial cost (21.7%), freedom from addiction (16.0%), and social influence (10.1%; “it’s affecting my friendships”).

Author, Year (Country)	Study design	Setting and population	Intervention type	Main outcomes
Berg, 2021 (US)	Longitudinal cohort study	Self-reported survey (n=1,133) young adults aged 18–34 years	Study examined readiness to quit e-cigarettes, recent quit attempts, motivation to quit, and confidence in quitting.	Readiness to quit e-cigarettes in the next six months was reported by 20.8%. Past year quit attempts were reported by 32.3%. There was a wide range across user profiles with highest levels reported among dual users.
Hughes & Callas, 2019 (US)	Cross-sectional reanalysis of data from the US Population Assessment of Tobacco and Health (PATH) survey	A representative longitudinal cohort study of American adults n=25; 13% were 18-24 yrs.; 73% 25-54 yrs.; 14% 55+ (NB percentages from weighted data.)	To examine withdrawal from electronic cigarettes and compare it to that from tobacco cigarettes	40% of e-cigarette-only users who quit reported one or more withdrawal symptoms; 25% met the clinical definition of withdrawal (4+ symptoms). Eating and anger were the most common symptoms. E-cigarette users who quit reported fewer withdrawal symptoms than tobacco cigarette users - though this may have been because tobacco cigarette users used more intensely or for longer periods than e-cigarette users.
Pepper et al., 2014 (US)	Online survey	State-wide sample (n = 561) of Minnesotan healthcare providers	Study examined healthcare providers' beliefs and attitudes about e-cigarettes and knowledge and comfort in referral pathways for adolescent patients	92% of providers were aware of e-cigarettes, and 11% had treated an adolescent patient who had used them. The most cited sources of information on e-cigarettes were patients, news stories, and advertisements. Providers reported moderately low levels of knowledge about and comfort in discussing e-cigarettes with adolescent patients and their parents.

Table 4 —Data extraction table: peer-reviewed reviews and commentaries on e-cigarette interventions in young adult populations

Author, Year	Aim(s) of the review	Major finding(s)
Liu et al., 2020	This was a review of theories and best practices for prevention and cessation programs for young children and adolescents	There is limited evidence for any best practice for e-cigarette cessation programs and a need for more effective and evidence-based tools, resources, and programs for adolescents. Programs should consider digital accessibility and interactive components in developing new adolescent cessation strategies.
Palmer et al., 2022	Sought to identify and evaluate literature concerning e-cigarette cessation, reasons for quitting and experiences of quitting. Papers included studies of both adolescents and older adults	They found that there was limited information and interventions that tested strategies for e-cigarette cessation. The authors made suggestions for future research, including: <ul style="list-style-type: none"> • Comparison studies between youth and adults • Standardising research definitions around dual use and acknowledging their different cessation needs • Extending studies to racial/ethnic minoritized populations, LGBTQI, and those with comorbid health or psychologic conditions • International comparisons on varying regulatory and cultural influences on e-cigarette use • Further research into participants who were uninterested in quitting and their motivations
Owens et al., 2020	To update the 2013 US Preventive Services Task Force review of the evidence on the benefits and harms of primary care interventions for tobacco use prevention and cessation in children and adolescents including e-cigarettes.	They concluded that there is currently insufficient evidence for the cessation of e-cigarette use among school-aged children and adolescents to assess the primary care–feasibility of interventions. Current studies on behavioural counselling interventions are not adequately powered and there is a lack of studies on medications/ pharmacologic interventions.
Berg et al., 2021	To review the extant literature concerning young adult e-cigarette cessation strategies, varying modes of delivery for interventions and motivations to quit or use e-cigarettes	<ul style="list-style-type: none"> • E-cigarette cessation intervention research in young adults and adolescents is limited • There is a need for further research to develop and optimize effective cessation interventions; especially around different user profiles, motivations to quit and motives to use • Technology-based approaches can be individualised and are a promising mode of delivery for cessation programs targeted at young e-cigarette users
Gaiha, 2021	This was an editorial introducing the papers in a special edition of a journal concerning young adults e-cigarette use, cessation and prevention by giving an	<ul style="list-style-type: none"> • Much of the editorial focussed on papers in the special edition which were mostly concerned with prevention of e-cigarette consumption • Pointed out the need for adequately powered experimental studies of effectiveness of e-cigarette cessation interventions, e.g., RCTs

Author, Year	Aim(s) of the review	Major finding(s)
	overview of background literature	
Dyson, 2021	To discuss the barriers and facilitators of e-cigarette cessation – focussed broadly on motivations to quit and was not specific to young cohorts	<ul style="list-style-type: none"> • E-cigarettes are not the final step to cigarette smoking cessation • Barriers to e-cigarette cessation include a fear of returning to tobacco, dependency and stress reduction • Facilitators of cessation included health beliefs, degree of enjoyment, social influences and environmental factors
Adams, 2021	Discussion paper on the challenges for adolescent e-cigarette cessation interventions, limitation of existing treatment approaches and recommendations for future research	<p>Research on the effectiveness existing nicotine use disorder treatments such as nicotine replacement therapy (NRT), bupropion, and varenicline, cognitive behavioural therapy, motivational therapy, and contingency management has been inconclusive when applied to adolescents (this was in relation to combustible cigarette cessation research). They suggest:</p> <ul style="list-style-type: none"> • The development of consistent, validated units of nicotine intake when using e-cigarettes to index the amount of nicotine intake and inform treatment decisions such as: <ul style="list-style-type: none"> ○ The collection of biospecimens such as urine samples ○ Measuring device/brand specific information such as cartridge nicotine concentration, ○ Use differences such as average number of puffs per use and frequency of use • Research on dual use and monitoring of other substances consumed via e-cigarette devices (e.g., types and sources of the substances) beyond nicotine solutions and implications for cessation strategies and treatments.

Appendix 1: Search strategy

Key concepts

	Concept 1	Concept 2	Concept 3	Concept 4
Word from RQ	<i>vaping</i>	<i>Cessation</i>	<i>Youth</i>	<i>Setting</i>
Synonyms (And antonyms)	"Electronic Nicotine Delivery"	self-help	youth	"clinical*"
	"e cigarette"	"cessation"	adolescent*	"clinical setting"
	"e-cigarette"	quit*	young	"behavioural intervention"
	"electronic cigarette"	prevent*	teen*	"Nicotine replacement therapy"
	"vaping"	"Smoking reduction"		"NRT"
	"JUUL"	"Harm reduction"		"primary care"
	"e-cig"	stop*		
	"vape"			
	"e-cigarette"			
	Juul			

Sources

1. Scopus

Search:

TITLE-ABS-KEY ("Electronic Nicotine Delivery" OR "e cigarette" OR "e-cigarette" OR "electronic cigarette" OR "vaping" OR "JUUL" OR "e-cig" OR "vape" OR "e-cigarette" OR juul)

AND

TITLE (self-help OR "cessation" OR quit* OR prevent* OR "Smoking reduction" OR "Harm reduction" OR stop*)

AND

TITLE-ABS-KEY (youth OR adolescen* OR young OR teen*)

AND

TITLE-ABS-KEY ("clinical*" OR "clinical setting" OR "behavioural intervention" OR "Nicotine replacement therapy" OR "NRT" OR "primary care")

Search hits: 166

2. Medline

Search:

((("Electronic Nicotine Delivery".tw. OR "e cigarette".tw. OR e-cigarette.tw. OR "electronic cigarette".tw. OR vaping.tw. OR JUUL.tw. OR e-cig.tw. OR vape.tw. OR e-cigarette.tw. OR juul.tw.))

AND

(self-help.ti. OR cessation.ti. OR quit*.ti. OR prevent*.ti. OR "Smoking reduction".ti. OR "Harm reduction".ti. OR stop*.ti.)

AND

(youth.tw. OR adolescen*.tw. OR young OR teen*.tw.)

AND

(clinical*.tw. OR "clinical setting".tw. OR "behavioural intervention".tw. OR "Nicotine replacement therapy".tw. OR NRT.tw. OR "primary care".tw.))

Search hits: 16

3. **CINAHL**

Search:

((((TI "Electronic Nicotine Delivery" OR AB "Electronic Nicotine Delivery") OR (TI "e cigarette" OR AB "e cigarette") OR (TI e-cigarette OR AB e-cigarette) OR (TI "electronic cigarette" OR AB "electronic cigarette") OR (TI vaping OR AB vaping) OR (TI JUUL OR AB JUUL) OR (TI e-cig OR AB e-cig) OR (TI vape OR AB vape) OR (TI e-cigarette OR AB e-cigarette) OR (TI juul OR AB juul))

AND

((TI self-help) OR (TI cessation) OR (TI quit*) OR (TI prevent*) OR (TI "Smoking reduction") OR (TI "Harm reduction") OR (TI stop*))

AND

((TI youth OR AB youth) OR (TI adolescen* OR AB adolescen*) OR young OR (TI teen* OR AB teen*))

AND

((TI clinical* OR AB clinical*) OR (TI "clinical setting" OR AB "clinical setting") OR (TI "behavioural intervention" OR AB "behavioural intervention") OR (TI "Nicotine replacement therapy" OR AB "Nicotine replacement therapy") OR (TI NRT OR AB NRT) OR (TI "primary care" OR AB "primary care")))

Search hits: 33

4. **Google Scholar**

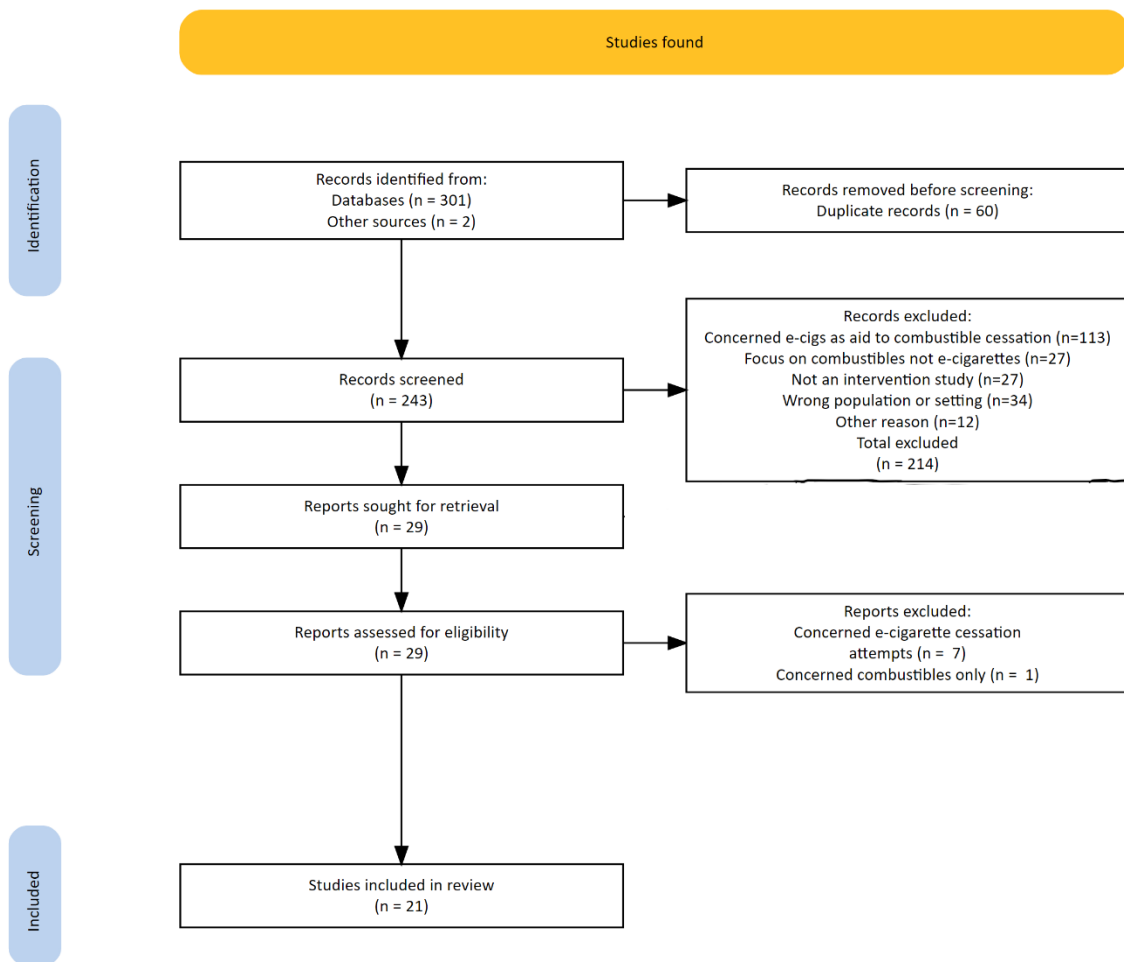
Search:

allintitle: (self-help OR cessation OR quit OR prevent OR "Smoking reduction" OR "Harm reduction" OR stop)

AND ("Electronic Nicotine Delivery" OR "e cigarette" OR e-cigarette OR "electronic cigarette" OR vaping OR JUUL OR vape)

Search hits: 315

Appendix 2: PRISMA Diagram



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