Clinical Guidance for Care of People Who Vape

Version 1 (Updated 1 July 2024)

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Statement of intent

This guidance serves to collate the best available evidence and international guidelines and offers recommendations based on our vaping policy roundtable's discussion. It is not intended to serve as a standard of medical care as there is insufficient clinical data available at the time of writing. Adherence to these recommendations may not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care. Each clinician is ultimately responsible for the management of his/her unique patient in the light of the clinical data presented by the patient and the diagnostic and treatment options available.

Summary

Summary of recommendations for vaping cessation (Annex A):

The evidence on vaping cessation tools and management strategies is still being studied with no strong evidence to pin recommendations down at the time of writing. The recommendations written below are based on current available knowledge and pegged on cigarette smoking cessation principles, keeping in mind that the underpinning reason for the difficulty in vaping cessation is likely stemming from nicotine addiction.

Below are our recommendations for vaping cessation:

1. Institutions should have a process in place to systematically identify people who vape to allow early referral for cessation support.

2. During consultations, the clinicians should assess the severity and dependence of the person who is vaping, assist with a quit plan and subsequently help to arrange for follow-up.

3. Use motivational interviewing with cognitive behavioral strategies to help people quit vaping.

4. The clinician can consider recommending cessation programmes like Health Promotion Board (HPB) I Quit Programme (https://www.healthhub.sg/programmes/iquit) to people who vape who are keen to stop vaping.

5. The use of Nicotine Replacement Therapy is a reasonable aid to vaping cessation.

6. The use of Bupropion and Varenicline for vaping cessation, on its own or in combination with Nicotine Replacement Therapy, may be considered but will need a discussion with the person who vapes on the risks and benefits, as well as an acknowledgement of the scarcity of evidence.

7. Behavioral therapy strategies and education should be offered to women who are pregnant and/or breastfeeding, adolescents/youths, people with a comorbid mental illness, and dual users of vaping and tobacco products.

8. Nicotine Replacement Therapy may be offered to women who are pregnant and/or breastfeeding, adolescents/youths, people with a comorbid mental illnesses and dual users of vaping and tobacco products in combination with behavioral therapy strategies. This decision will need to be made after a discussion with the vape user, in view of the limited evidence on the use of Nicotine Replacement Therapy for vaping cessation.

9. We DO NOT recommend Bupropion or Varenicline to be offered to women who are pregnant and/or breastfeeding or adolescents/youths who are vaping.

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1. Introduction

Vaping is the process of inhaling and exhaling aerosol produced by an electronic cigarette (e-cigarette), vape pen, or personal aerosolizer. When such devices contain nicotine, they are known as Electronic Nicotine Delivery Systems or ENDS devices (Bonner 2019). The purchase, use and possession of all types of vaping device are illegal in Singapore. Despite this, there is evidence of an increase in the prevalence of use, both in Singapore and overseas with a marked increase of 58% in the purchase, use or possession of vapes in 2023 in Singapore (Tan 2024). Vaping can be highly addictive, with some e-liquids containing stronger and/or more bioavailable forms of nicotine compared to cigarettes and differences in vape usage patterns that, compared with cigarette use, may result in more frequent usage. Due to the illegal status of vaping in Singapore, people who vape may be reluctant to seek help to quit vaping.

Vapes that have been adulterated with Vitamin E acetate has been linked to E-cigarette or Vaping product use-associated Lung Injury (EVALI) with catastrophic respiratory failure (Christiani 2020). The recent entry of e-cigarettes onto the market and broad diversity of products has made the study of their long-term health impacts challenging. Nevertheless, studies have linked vaping to emphysema, airway obstruction and inflammation, atherosclerosis, aortic stiffness, increased blood pressure (Tsai et al., 2020) and cancer (Dinakar 2016). Therefore, it is imperative to provide avenues for people who vape to seek help. People who intent to quit should be allowed to stop vaping in a safe and non-judgmental environment.

2. Methodology

In December 2023 to January 2024, we searched for clinical practice guidelines, case reports and randomised controlled trials (RCTs) for vaping cessation in PubMed and Google using the MeSH terms vaping, cessation, guideline, case report and randomised controlled trial. We searched for any publication printed in English and there were no time restrictions. We identified 10 relevant guidance documents for vaping cessation from the United States, Australia, New Zealand, Canada, the United Kingdom, and UpToDate, six case reports, and four RCTs. ((American Academy of Pediatrics, 2023, American Academy of Pediatrics, 2023, American Academy of Pediatrics, 2023; Asthma Respiratory Foundation NZ, 2023; Barkat et al., 2019; Caponnetto et al., 2023; Centre for Addiction and Mental Health, 2022; Graham et al., 2021; Heart Foundation Australia and Quit, 2021; Huerne et al., 2023; Khangura et al., 2021; Kundu et al., 2023; Livingston et al., 2019; Liu et al., 2020; Lyu et al., 2022; Macedonia et al., 2020; McEwen et al., 2023; Metcalf et al., 2022; NSW Ministry of Health, 2023; Oliver et al., 2022; Owens et al., 2020; Palmer et al., 2022; Rosen et al., 2023; Sahr et al., 2020; Sanchez et al., 2021; Schuster et al., 2023; Sikka et al., 2021; Silver et al., 2016; Struik et al., 2021; Su et al., 2023; Wahhab et al., Year Unknown; Zawertailo et al., 2023) From December 2023 to February 2024, we interviewed 14 Singapore clinical practitioners from pharmacy, psychology, medicine, smoking cessation counselling and youth welfare who had encountered vaping cases in their practice, to understand the specific challenges faced and seek their views on best practices for treating vaping cases in the Singapore context. In April 2024, we held a vaping policy roundtable with 27 participants from a range of organizations in Singapore (see acknowledgements), and points made during the roundtable were summarised in a meeting report. The literature review, interviews and meeting report were, with consensus from the authors, used to construct this guidance document.

3. Target group

This guidance is designed primarily for clinicians who want to assist people who want to quit vaping.

4. Approach

The priority is to provide people who vape with support whenever help is sought to reduce and/or stop vaping. The end goal should be nicotine cessation and prevention of relapse to reduce the dangers associated with nicotine addiction. People who vape need to be identified so that they may receive help to stop vaping. Help should be given without prejudice and judgement to allow building trust and developing a therapeutic relationship between care provider and the person who vapes.

It is also important to identify patients who are at risk of vaping related complications and exacerbating underlying chronic medical illnesses such as acute or chronic respiratory diseases and cardiovascular diseases (Bonner 2022). Certain groups of patients, such as youths, pregnant women, women who are breastfeeding, those who have concomitant mental illnesses, and a history of substance abuse, may need more specialised care as these individuals may have unique risks. Young people who vape may have a longer exposure to the potential harmful contents within vape devices if they fail to quit and are prone to developing more severe nicotine addictions as their

brains are still developing (Bonner 2022). Pregnant and/or breastfeeding women may face more complex health risks from vaping as there is potential maternal harm and also potential exposure of toxins to the fetus or baby (Miech 2019; Vilcassim 2023). Vape users with underlying mental illness and history of substance abuse are generally more complex to treat for vaping cessation (Becker 2021).

A systematic approach to capture smoking status to allow brief advice to be administered, and subsequently providing a referral to smoking cessation services for smokers who are keen, have been shown to improve quit rates and reduce hospital readmission and bed days (Mullen 2017). Accurate capture of the smoking status is imperative to identify potential smokers who can get advice and cessation aid. This approach could be extrapolated to vaping.

The guidance written here is to provide suggestions to help vape users to reduce and ultimately stop vaping. The principles applied should be a precautionary approach and to encourage users to stop vaping in lieu of the scarcity of robust trials on vaping cessation. The vape user should make an informed decision together with the cessation counsellor on the best strategies to help them in their journey to stop vaping.

5. Identifying people who vape

In Singapore, vaping generally presents to clinicians as a secondary issue, either incidentally from a clinical encounter or as a result of being caught for vaping offences. Relatively few proactively reach out to cessation services for help. Hence, a broad range of health care workers may potentially encounter a person who vapes which was not the primary intent for seeking medical attention. Routine screening for vaping should be incorporated into the medical professional's routine clinical work for better identification of people who vape.

We recommend a systematic approach to identify vape users who can benefit from a referral to the cessation counsellor. The Ask, Brief advice, and Cessation Support (ABC) framework is an example of a systematic approach of identifying smokers which can also be applied to people who vape.

Ask (A)
During every clinical visit or on admission, the patient/client should be asked if he or she vapes. Document in the electronic health records if the patient/client uses cigarettes and/or any form of vaping product. The number of cigarettes or puffs of vaping in a day should be documented along with the start date. Former users should also be documented along with the end date.

Brief Advice (B)
Brief advice on the dangers of vaping should be given. If brief advice was given during the clinical encounter, this should be documented in the electronic health records.

Cessation Support (C)
Vape users who are keen to do vaping cessation counselling should be informed to the care provider for a referral to see a cessation counsellor. For vape users who are admitted to hospital, referral should be made to an inpatient counsellor if the service is available. Ideally, vape users should be

seen prior to discharge. If this is not feasible, then an outpatient appointment should be given to vape users. All outpatient referrals should be seen early (preferably within 2 weeks) as the motivation to quit vaping may wane with time.

Recommendation:

- *Institutions should have a process in place to systematically identify people who vape to allow early referral for cessation support.*

6. Special considerations related to illegal status

In view of the illegal nature of vaping in Singapore, it is possible that people who vape will be reluctant to disclose their vaping status and provide necessary details to clinicians on usage habits. Reassurances of no legal or criminal consequences, to both people who vape and clinicians treating people who vape, is needed to allow proper assessment to be made. From the recent vaping policy roundtable discussion, it was clarified that, if clinical practitioners encounter patients/clients who vape in their practice, it is not mandated that they report every case to the authorities for their vaping.

People are more likely to be open to discuss their vaping if a good rapport is built with assurances that their vaping will not be reported to the authorities or, in the case of youths, to their parents. Privacy and a conducive environment is key to obtaining an accurate vape use history. While practitioners should make it clear that disclosing vaping status to them will not incriminate them, clinicians should also highlight to their patients/clients that if caught, they are subject to the same legal penalties as other offenders[1].

7. Assessment of nicotine dependence

Assessment of the amount of nicotine used is important to understand the level of dependence of a person who vapes. Doing so can be challenging due to the varied ENDS devices and e-liquid contents, and inaccurate labelling/disclosure of nicotine content and other constituents in e-liquids that may increase the addictiveness of vape products. Many vape users also adopt the habit of "grazing", whereby they frequently vape small amounts throughout the day. This adds to the complexity of assessing the severity of nicotine addictions among vape users, and the amount of nicotine inhaled in a single day.

As part of cessation support, vape users should be assessed on the severity and dependence on vaping. Determine the vape user's stage of readiness to change: precontemplation, contemplation, preparation, action, or maintenance. Although there are no validated tools to assess vaping dependence, the healthcare provider may use any of the available online tools that suit the need of the person who vapes.

[1] Under the Tobacco (Control of Advertisements and Sale) Act, the possession, use or purchase of vapes carries a maximum fine of $2,000. It is also an offence to import, distribute, sell or offer for sale e-vaporisers and their components. Any person convicted of an offence is liable to a fine of up to $10,000, or imprisonment of up to six months or both for the first offence, and a fine of up to $20,000, or imprisonment of up to 12 months or both for the second or subsequent offence.

Some available tools:
Adults: E-FTND, EDS, PS-ECDI. M-HONC
Youth: M-HONC, EDS

(*E-FTND: E-cigarette Fagerstrom Test of Nicotine Dependence; EDS: E-cigarette Dependence Scale; PS-ECDI: The Penn State Electronic Cigarette Dependence Index; M-HONC: Modified Hooked on Nicotine Checklist)

Reasons for vaping should be asked during the initial clinic visit and to identify possible triggers and motivations for vaping. It is also important to explore the reasons for wanting to stop vaping. The potential health risks associated with vaping, both in the short and long term, should be explained. Assist with providing a quit plan by goal setting, for example, a quit date.

Arrange follow-up by scheduling follow-up visits, either in person or via teleconsultation. Follow up should occur soon after the quit attempt, preferably during the first week. A second follow-up contact is recommended within the first month. Schedule further follow-up visits as indicated. A longer period of follow-up may be required in view of the complexity and scarcity of evidence in the management of vape addiction.

It is also important to consider the broader context in which vaping behaviour is occurring in conjunction with the social and family environment, mental health and other nicotine and substance drug use. Support for these should also be considered.

Recommendation:

- *During consultations, the clinicians should assess the severity and dependence of the person who is vaping, assist with a quit plan and subsequently help to arrange for follow-up.*

8. Management

Treatment strategies should be based on the needs of each person. These should be individualized to develop a person-centered treatment plan.

8.1 Behavioral therapy strategies

There is currently limited evidence for behavioral therapy recommendations to help people quit vaping. Most published recommendations are based on preliminary results and are largely adapted from smoking cessation strategies. No single behavioral strategy has been shown to be superior and a combination and personalized behavioral strategies will likely be required. The main goal is to prevent the craving to help the patient/client get through the withdrawal period. Most strategies entail some form of distraction, either via drinking water, deep breathing, distracting with other activities or acquiring other forms of dopamine release such as candy or snacks, and to time and delay the next inhalation. This is better known as the 4D technique (Fiore et al.,2008).

Vape users may also be referred to the Health Promotion Board (HPB)'s I Quit Programme, which is a multi-pathway smoking cessation programme that provides ongoing support and accessible

strategies to help in quitting nicotine seeking behaviors. At the time of writing, the I Quit Programme is mainly designed for smoking cessation. However, it is still a potential tool to be used and reassurance can be given to patients/clients that their vaping habits will be kept confidential and not reported. Patients/clients can go on-board I Quit by signing up through go.gov.sg/iquit

Motivational interviewing can be used with cognitive behavioral strategies to help people who vape. The purpose is to allow a patient/client-centered engagement to build rapport and self-efficacy, encourage ownership and self-responsibility for change, and educate on the potential harms of vaping. The patient/client should be encouraged to seek social support, either from relatives or friends, if available, to help encourage and motivate their ongoing efforts to quit and support the behaviour change process.

Recommendations:

- *Use motivational interviewing with cognitive behavioral strategies to help people quit vaping.*
- *The clinician can consider recommending cessation programmes like Health Promotion Board (HPB) I Quit Programme (https://www.healthhub.sg/programmes/iquit) to people who vape who are keen to stop vaping.*

8.2 Pharmacotherapy strategies

There are limited trials on the efficacy of pharmacotherapy strategies in vaping cessation. Most international guidelines recommend a patient-centered approach and discuss the principles and side effects of pharmacotherapy.

Nicotine Replacement Therapy (NRT)

The appropriate dosing of NRT can be challenging to calculate for vape users, as the amount of nicotine in each vape pod can vary widely, ranging from 0 mg/ml to 60 mg/ml (Voos 2019), and labelling is often missing or inaccurate, with vape pods that contain nicotine commonly labelled as ‘nicotine free’. Some pods can be modified to deliver higher doses of nicotine by varying voltage and coil resistance on the e-cigarettes (Voos 2019).

Nicotine is the main addictive compound in vape liquids. NRT helps to reduce cravings and withdrawal symptoms in smoking cessation. Hence, NRT may be useful for those who want to quit vaping and for those who are keen to wean themselves from vaping. A combination therapy may be used, such as using the NRT patch for a steady nicotine release and the gum, lozenge or mouth spray on an as-needed basis to manage cravings. Based on the interviews conducted for this guidance, clinicians shared that the NRT delivered via mouth spray closely mimics the vaping effect, and may be another suitable option for vape users. Following the principles of nicotine replacement for people who use cigarettes, clinicians should try to estimate the amount of nicotine contained within the vape pod, and the initial dose of NRT should try to match the nicotine use as closely as possible. The suggested NRT dosing for people who vape is depicted in Table 1.

Table 1: Suggested dosing of Nicotine Replacement Therapy*

1. Assess best estimate of nicotine amount taken per day based on known content of vape devices. **2. Prescribe NRT for 4 weeks or until next appt if within 4 weeks.**		
≤ 7mg nicotine / day	**8-14mg nicotine / day**	**≥ 15mg nicotine / day**
Nicotine 7mg/24h patch daily	Nicotine 14mg/24h patch daily	Nicotine 21mg/24h patch daily
PLUS **Nicotine 1mg lozenge** OR **Nicotine 2mg gum** OR **Nicotine 1mg mouth spray** for breakthrough cravings (to stop once symptom/s such as nausea/vomiting/headache/dizziness occur)		

**Recommendations made based on smoking cessation data as there is currently relatively little evidence guiding vaping cessation.*

To address the inconsistent or inaccurate labelling of nicotine content in vape devices, one approach is to back-titrate by starting people who vape on a flexible dose, such as NRT lozenge, gum or mouth spray, for 1-2 weeks then calculating NRT dose based on how much NRT was consumed. However, this approach will likely require more frequent visits and/or a longer treatment period to find the appropriate dosage.

There is little evidence on whether tapering is effective and the optimal method to achieve this. The Australian guidelines suggest to reduce the nicotine levels every two to four weeks in conjunction with the reduction in vape sessions, together with behavioral support. The risk of relapse needs to be informed and support should be given during this period.

Bupropion

Bupropion is a non-nicotine oral therapy which was originally developed for the treatment of depression. It has been shown to be efficacious in smoking cessation, especially when combined with NRT. However, published evidence is still lacking for vaping cessation. Any recommendation to use bupropion on its own or in combination with NRT, as well as the side effects of use, will need to be discussed with the vape user. These discussions should be documented in the vape user's medical records.

Fetal harm has been demonstrated. Bupropion is not recommended for pregnant and/or breastfeeding women or adolescents/youths.

Varenicline

Varenicline is a nicotinic receptor partial agonist, developed specifically for smoking cessation, that relieves craving and withdrawal symptoms. Varenicline has been shown to be effective in smoking cessation, especially in combination with NRT. The evidence for use in vaping cessation is similarly lacking and a trial consisting of a 12-week treatment phase followed by a 12-week follow-up non-treatment phase is reasonable (RACGP 2022). The side effects need to be counselled and the lack of current evidence in vaping cessation needs to be discussed with the vape user. These should be documented in the vape user's medical records.

Varenicline is not licensed for < 18 years old or pregnant and/or breastfeeding women.

Recommendations:

- *The use of Nicotine Replacement Therapy is a reasonable aid to vaping cessation.*
- *The use of Bupropion and Varenicline for vaping cessation, on its own or in combination with Nicotine Replacement Therapy, may be considered but will need a discussion with the person who vapes on the risks and benefits, as well as an acknowledgement of the scarcity of evidence.*

9. Specific sub-populations

9.1 Pregnant and/or breastfeeding women

There is little evidence on the use of pharmacotherapy for vaping cessation in women who are pregnant and/or breastfeeding. However, there are potential harms to the mother and the fetus (Breland, 2019) and fetal harm has been demonstrated by bupropion. Behavioral therapy should be offered as first line option to help people who are pregnant and/or breastfeeding to quit vaping. NRT may be considered as a second line option (comparing use of NRT to vaping), provided the pregnant and/or breastfeeding women and healthcare providers make an informed decision. Bupropion and varenicline should NOT be offered to pregnant and/or breastfeeding women.

9.2 Children and young people

Children and young people who are under 18 years old and vaping are at a heightened risk of developing nicotine addiction early in life and vaping may act as a gateway to using tobacco or other harmful substances (Meich 2019). They should receive cessation counselling, with behavioural therapy and education recommended as first line. Depending on the child's age and severity of his/her nicotine addiction, NRT may be considered as an adjunct to help with the process of quitting vaping, particularly for those with more severe nicotine addictions. This includes youths age 15-18 years who have developed dependence to vaping. NRTs have not been studied for children younger than 15 especially in the context of vaping. Safety and effectiveness of bupropion and varenicline in adolescents/youths are not established.

Vaping is associated with poor mental health in youths. Youths have a higher likelihood of picking up a vaping device from their social environment, such as friends and family members (Becker, 2021; Bonner, 2021). Whenever possible, consider assessing the patient/client's social

environment, including their family environment, and consider referral to evaluate and address underlying mental health issues.

9.3 People with a comorbid mental illness

Smoking is highly prevalent amongst people with mental illness. These groups of patients/clients may have a higher relapse rate and may require longer treatment. Behavioral therapy strategies with or without pharmacotherapy to help quit vaping should be offered after education to address any misconceptions (for instance, the belief that vaping or smoking improves mental health) and a discussion with the vape user. For cases that require specialist help, referring for psychiatry expertise to support both the addiction and mental illness is recommended.

9.4 Dual users of vaping and tobacco products

For patients/clients who use both tobacco and vaping products, healthcare providers should discuss the risks and potential harms of dual usage. The harms of dual usage may be compounded with higher risks of respiratory diseases and higher dependence (Bonner 2021). While cutting down could be part of a plan to wean the person off nicotine completely, the eventual goal should be to quit completely as the health benefits are mainly experienced after complete cessation. Strategies should be tailored to help them stop both vaping and tobacco use. Behavioral therapy strategies in combination with pharmacotherapy should be offered in discussion with the patient/client.

Recommendations:

- *Behavioral therapy strategies and education should be offered to women who are pregnant and/or breastfeeding, adolescents/youths, people with a comorbid mental illness, and dual users of vaping and tobacco products.*
- *Nicotine Replacement Therapy may be offered to women who are pregnant and/or breastfeeding, adolescents/youths, people with a comorbid mental illnesses and dual users of vaping and tobacco products in combination with behavioral therapy strategies. This decision will need to be made after a discussion with the vape user, in view of the limited evidence on the use of Nicotine Replacement Therapy for vaping cessation.*
- *We DO NOT recommend Bupropion or Varenicline to be offered to women who are pregnant and/or breastfeeding or adolescents/youths who are vaping.*

10. Conclusion

Vape users are exposed to potential harms as a result of using vaping products. A systematic approach to identify people who vape should be in place so that appropriate advice and help can be given to them. Although there is a lack of robust trials for vaping cessation, the principles of behavioral therapy strategies can be used to help people quit vaping. Current pharmacotherapies available for smoking cessation are reasonable to be considered in people who vape.

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Annex A: Recommendations for vaping cessation

Recommendations for vaping cessation
1. Institutions should have a process in place to systematically identify people who vape to allow early referral for cessation support.
2. During consultations, the clinicians should assess the severity and dependence of the person who is vaping, assist with a quit plan and subsequently help to arrange for follow-up
3. Use motivational interviewing with cognitive behavioral strategies to help people quit vaping.
4. The clinician can consider recommending cessation programmes like Health Promotion Board (HPB) I Quit Programme (https://www.healthhub.sg/programmes/iquit) to people who vape who are keen to stop vaping.
5. The use of Nicotine Replacement Therapy is a reasonable aid to vaping cessation.
6. The use of Bupropion and Varenicline for vaping cessation, on its own or in combination with Nicotine Replacement Therapy, may be considered but will need a discussion with the person who vapes on the risks and benefits, as well as an acknowledgement of the scarcity of evidence.
7. Behavioral therapy strategies and education should be offered to women who are pregnant and/or breastfeeding, adolescents/youths, people with a comorbid mental illness, and dual users of vaping and tobacco products.
8. Nicotine Replacement Therapy may be offered to women who are pregnant and/or breastfeeding, adolescents/youths, people with a comorbid mental illnesses and dual users of vaping and tobacco products in combination with behavioral therapy strategies. This decision will need to be made after a discussion with the vape user, in view of the limited evidence on the use of Nicotine Replacement Therapy for vaping cessation.
9. We DO NOT recommend Bupropion or Varenicline to be offered to women who are pregnant and/or breastfeeding or adolescents/youths who are vaping.

Annex B: Nicotine Replacement Therapy suggested dosing*

1. Assess best estimate of nicotine amount taken per day based on known content of vape devices. **2. Prescribe NRT for 4 weeks or until next appt if within 4 weeks.**		
≤ 7mg nicotine / day	**8-14mg nicotine / day**	**≥ 15mg nicotine / day**
Nicotine 7mg/24h patch daily	Nicotine 14mg/24h patch daily	Nicotine 21mg/24h patch daily
PLUS **Nicotine 1mg lozenge** OR **Nicotine 2mg gum** OR **Nicotine 1mg mouth spray** for breakthrough cravings (to stop once symptom/s such as nausea/vomiting/headache/dizziness occur)		

**Recommendations made based on smoking cessation data as there is currently very little evidence guiding vaping cessation.*

Annex C – Assessment tools - *(List was compiled by the Training Enhancement in Applied Cessation Counselling and Health (TEACH) programme at CAMH - Used with permission from Centre for Addiction and Mental Health's (CAMH))*

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List of Assessment Tools

The E-cigarette Fagerström Test of Cigarette Dependence (e-FTCD)	The e-cigarette Fagerström Test of Cigarette Dependence (e-FTCD) is adapted from the validated Fagerström Test of Cigarette Dependence (FTCD) by replacing all references to "cigarettes" with "e-cigarettes", and all references of "smoking" to "vaping". Scores are calculated as a sum of the response items, with higher scores indicating higher levels of dependence (Piper et al., 2020). A copy of the tool has been provided at the end of the document.
E-cigarette Dependence Scale (EDS)	The E-cigarette Dependence Scale (EDS) is adapted from the Patient-Reported Outcome Measurement Information System (PROMIS) Tobacco Dependence Bank. The 22-, 8- and 4-item scales have been validated and provide an effective measure of e-cigarette nicotine dependence among both adults and youth (Morean et al., 2018, 2019). Higher scores indicate greater dependence. A copy of the tool has been provided at the end of the document.
The Penn State Electronic Cigarette Dependence Index (PS-ECDI)	Adapted from the Penn State Nicotine Dependence Index, the Penn State Electronic Cigarette Dependence Index (PS-ECDI) is a validated 10-item scale used to assess e-cigarette dependence (Center for Research on Tobacco and Health, 2021). The scale includes questions to assess various constructs of dependence, such as time to first e-cigarette, times per day, cravings, irritability, and waking at night to vape. A score of 13 or more indicates high dependence (Vogel et al., 2020). A copy of the tool has been provided at the end of the document.
Hooked on Nicotine Checklist (HONC)	A ten-item screening scale also used to identify the point at which an individual has lost full autonomy over their nicotine use. Used to determine the onset and strength of nicotine dependence. The scale assesses lifetime occurrence of cravings, withdrawal, and difficulties with cessation. Can be used with youth (12+) (McKelvy et al., 2018; Boykan et al., 2019). A copy of the tool has been provided at the end of the document.

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The E-cigarette Fagerström Test of Cigarette Dependence

Tool taken from: Piper, M.E., Baker, T.B., Benowitz, N.L., Smith, S.S., & Jorenby, D.E. (2020). E-cigarette dependence measures in dual users: reliability and relations with dependence criteria and e-cigarette cessation. Nicotine and Tobacco Research, 22(5), 756-763.

Scoring taken from: Johnson, J. M., Muilenburg, J. L., Rathbun, S. L., Yu, X., Naeher, L. P., & Wang, J. S. (2018). Elevated Nicotine Dependence Scores among Electronic Cigarette Users at an Electronic Cigarette Convention. Journal of community health, 43(1), 164–174. https://doi-org.myaccess.library.utoronto.ca/10.1007/s10900-017-0399-3

1	How many times per day do you usually use your electronic cigarette? (Assume that one "time" consists of around 15 puffs or lasts around 10 minutes.)	O 0-4 times/day (0) O 5-9 (0) O 10-14 (1) O 15-19 (1) O 20-29 (2) O 30+ (3)
2	Do you find it difficult to refrain from vaping in places where it is forbidden (e.g. in church, at the library, in the cinema)?	O Yes (1) O No (0)
3	When would you hate most to give up e-cigarette use?	O In the morning (1) O During or after meals (0) O During or after stressful situations (0) O None of the above (0)
4	On days that you can use your electronic cigarette freely, how soon after you wake up do you first use your electronic cigarette?	O 0-5 mins (3) O 6-15 (2) O 16-30 (2) O 31-60 (1) O 61-120 (0) O 121+ (0)
5	Do you use your e-cigarette more frequently during the first two hours of the day than during the rest of the day?	O Yes (1) O No (0)
6	Do you use your e-cigarette when you are so ill that you are in bed most of the day?	O Yes (1) O No (0)

Scoring eFTND: Sum the items. Total score: 0-2 = low dependence, 3-4 = low to moderate dependence, 5-7 = moderate dependence, 8+ = high dependence

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E-cigarette Dependence Scale

Taken from: Morean, M.E., Krishnan-Sarin, S., Sussman, S., Foulds, J., Fishbein, H., Grana, R., & O'Malley, S.S. (2019). Psychometric Evaluation of the E-cigarette Dependence Scale. Nicotine and Tobacco Research, 21(11), 1556-1564.

4-item EDS = Items 1 – 4	**8-item EDS** = Items 1 – 8			**22-item EDS =** Items 1 – 22		
Item	**Instructions**. Please respond to each question marking one box per row.	Never (0)	Rarely (1)	Sometimes (2)	Often (3)	Almost Always (4)
1	I find myself reaching for my e-cigarette without thinking about it.					
2	I drop everything to go out and buy e-cigarettes or e-juice.					
3	I vape more before going into a situation where vaping is not allowed.					
4	When I haven't been able to vape for a few hours, the craving gets intolerable.					
5	When I'm really craving an e-cigarette, it feels like I'm in the grip of some unknown force that I cannot control.					
6	I crave vaping at certain times of day.					
7	My urges to vape keep getting stronger if I don't vape.					
8	After not vaping for a while, I need to vape in order to avoid feeling any discomfort.					
9	My desire to vape seems overpowering.					
10	Cravings for an e-cigarette					

	make it difficult for me to quit.					
11	It is hard to ignore urges to vape.					
12	When I go without vaping for a few hours, I experience cravings.					
13	I frequently crave e-cigarettes/vaping.					
14	The idea of not vaping causes me stress.					
15	When I run out of e-cigarettes or e-juice, I find it almost unbearable.					
16	I get a real gnawing hunger for an e-cigarette when I haven't vaped in a while.					
17	I vape even when I am so ill that I am in bed most of the day.					
18	When I go too long without vaping I feel impatient.					
19	It is hard for me to go without vaping for a whole day.					
20	When I go too long without vaping, I get strong urges that are hard to get rid of.					
21	Vaping is a large part of my daily life.					
22	I am tempted to vape when I realize I haven't vaped for a while.					

Scoring : Sum the items. Greater scores signify greater dependence.

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The Penn State Electronic Cigarette Dependence Index

Taken from: Foulds, J., Veldheer, S., Yingst, J., Hrabovksy, S., Wilson, S.J., et. al, (2015). Development of a questionnaire for assessing dependence on electronic cigarettes among a large sample of ex-smoking e-cigarette users. *Nicotine & Tobacco Research, 17*(2), 186-192.

1	How many times per day do you usually use your electronic cigarette? (Assume that one "time" consists of around 15 puffs or lasts around 10 minutes.)	O 0-4 times/day (0) O 5-9 (1) O 10-14 (2) O 15-19 (3) O 20-29 (4) O 30+ (5)
2	On days that you can use your electronic cigarette freely, how soon after you wake up do you first use your electronic cigarette?	O 0-5 mins (5) O 6-15 (4) O 16-30 (3) O 31-60 (2) O 61-120 (1) O 121+ (0)
3	Do you sometimes awaken at night to use your electronic cigarette?	O Yes (1) O No (0)
4	If yes, how many nights per week do you typically awaken to use your electronic cigarette?	O 0-1 nights (0) O 2-3 nights (1) O 4+ nights (2)
5	Do you use an electronic cigarette now because it is really hard to quit?	O Yes (1) O No (0)
6	Do you ever have strong cravings to use an electronic cigarette?	O Yes (1) O No (0)
7	Over the past week, how strong have the urges to use an electronic cigarette been?	O None/Slight (0) O Moderate/Strong (1) O Extremely Strong (2)
8	Is it hard to keep from using an electronic cigarette in places where you are not supposed to?	O Yes (1) O No (0)
9	Did you feel more irritable because you couldn't use an electronic cigarette?	O Yes (1) O No (0)
10	Did you feel nervous, restless, or anxious because you couldn't use an electronic cigarette?	O Yes (1) O No (0)

PS-ECDI Scoring: Sum the items. Total scoring: 0–3= not dependent, 4–8 low dependence, 9–12 medium dependence, 13+ = high dependence.

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The Hooked on Nicotine Checklist

Taken from:

American Academy of Pediatrics. (2019). Assessing nicotine dependence in adolescents [PowerPoint slides]. Retrieved from E-cigarette Curriculum: https://downloads.aap.org/AAP/PDF/2D_Assessing_Nicotine_Dependence_in_Adolescents.pdf

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		Yes	No
1	Have you ever tried to stop vaping, but couldn't?		
2	Do you vape now because it is really hard to quit?		
3	Have you ever felt like you were addicted to vaping?		
4	Do you ever have strong cravings to vape?		
5	Have you ever felt like you really needed to vape?		
6	Is it hard to keep from vaping in places where you are not supposed to, like school?		

When you tried to stop vaping (or, when you haven't vaped for a while...)

7	Did you find it hard to concentrate because you couldn't vape?		
8	Did you feel more irritable because you couldn't vape?		
9	Did you feel a strong need or urge to vape?		
10	Did you feel nervous, restless or anxious because you couldn't vape?		

HONC Scoring: Sum the number of 'yes' responses. Any score greater than zero indicates that the client has lost some degree of autonomy over their vaping.