# Recommendations on interventions for tobacco smoking cessation in adults in Canada

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## Abstract

**Background:** Tobacco smoking is the leading cause of preventable disease and death in Canada. The objective of this Canadian Task Force on Preventive Health Care guideline is to provide primary care providers with evidence-based recommendations on smoking cessation options for nonpregnant adults aged 18 years or older who smoke tobacco cigarettes.

**Methods:** We commissioned systematic reviews on evidence of benefits and harms of smoking cessation interventions in adults, comprising an overview of Cochrane reviews on behavioural interventions, pharmacotherapy, and other interventions, and a systematic review on electronic cigarettes (e-cigarettes). We used the Grading of Recommendations, Assessment, Development and Evaluation approach to determine the certainty of evidence for each outcome and strength of recommendations; adhered to the Guidelines International Network (GIN) principles for managing competing interests; and followed Appraisal of Guidelines for Research and Evaluation (AGREE II), GIN, and Guidance for Reporting Involvement of Patients and the Public reporting guidance.

**Recommendations:** As part of good clinical care, providers are expected to be knowledgeable about their patients' smoking status. We recommend that all people who smoke tobacco cigarettes be encouraged to stop and offered 1 or more recommended smoking cessation interventions (strong recommendation, high certainty). We provide a menu of recommended interventions that include behavioural, pharmacotherapy, and combined interventions. Shared decision-making should be used to determine patients' cessation preferences. We suggest against using e-cigarettes for smoking cessation for most people because of uncertainty about unapproved products, long-term harms, and public health impacts, but recognize that this may be considered for people who have unsuccessfully attempted other interventions or express a strong preference.

**Interpretation:** This guideline provides a menu of evidence-based options to support smoking cessation. The menu approach places a strong emphasis on using shared decision-making to help guide people who smoke to options that are accessible to them and fit their values and preferences.

Tobacco smoking is the leading cause of preventable disease and death in Canada because of the increased risk of many types of cancer, respiratory disease, cardiovascular disease, and other health conditions.[1–7] In 2022, 11% of Canadians aged 15 years or older were currently smoking tobacco (13% of males and 9% of females),[8] and about 75% of them were smoking daily.[8] Populations in Canada with high smoking prevalence include people who are single, separated, divorced, or widowed; identify as gay or bisexual; have lower levels of education; are workers whose jobs do not require training or a specific level of education; identify as First Nations, Inuit, or Métis; or have mental health diagnoses or substance use disorders.[9,10] Most of the harm from cigarettes is due to inhalation of cigarette smoke that contains more than 7000 chemicals, of which about 70 are carcinogens.[2] People who smoke tobacco regularly do so because of the highly addictive nature of nicotine. This drives ongoing smoking even among people who may desire to quit.[11]

Quitting smoking increases life expectancy and improves mental health and quality of life.[12,13] Behavioural interventions to promote smoking cessation may include brief advice from a health care provider of a few minutes or less; individual or group counselling with a counsellor trained in smoking cessation; telephone quit lines; text message interventions; self-help materials; and interventions delivered via Internet-based programs or apps. Internet programs differ from self-help interventions in that they may involve a 2-way flow of information between participants and a website or app.[14] Behavioural interventions are often combined with pharmacotherapy.

 

### Key messages for the public

- Quitting smoking improves health; reduces the risk of serious illnesses like heart disease, stroke, and cancer; and increases lifespan.
- Quitting smoking can be challenging, but there are effective options to increase people's odds of quitting for good in the long term, including advice or counselling from health care practitioners, medications, and self-help information.
- People who smoke should talk to a health care provider for more information on which options may be best for them.
- E-cigarettes are sometimes used as an aid to stop smoking; however, there are concerns about this approach, including a lack of e-cigarette products approved for smoking cessation and limited information on long-term health effects, such as on lung or heart health.
- Most people should first consider options other than e-cigarettes to stop smoking.

In Canada, 3 pharmacotherapies (bupropion, nicotine replacement therapy [NRT], varenicline) are approved for smoking cessation,[15,16] with others available as approved natural health products (e.g., cytisine).[16] E-cigarettes (also referred to as vaporizers, "vapes," or electronic nicotine delivery systems) might also help users quit tobacco smoking or reduce harms of smoking if a person switches from cigarettes to e-cigarettes.[17] No e-cigarette products, however, have been approved for smoking cessation in Canada.[18]

Preferences for smoking cessation interventions vary, and people may attempt to quit multiple times with different interventions or combinations of interventions before being successful.[19] This guideline provides a menu of evidence-based interventions that can be provided or referred to by practitioners to help adults choose options that are accessible to them and best fit with their values and preferences. This is the first guideline from the Canadian Task Force on Preventive Health Care on smoking cessation for adults. It complements the task force's 2017 recommendations on behavioural interventions for the prevention and treatment of cigarette smoking among school-aged children and youth.[20]

## Scope

These recommendations provide guidance to primary care professionals — including physicians, nurses, and others who serve as a first point of contact for people who smoke — on smoking cessation for nonpregnant adults aged 18 years or older who currently smoke tobacco cigarettes. This includes those who smoke regularly or occasionally, and those motivated or not motivated to quit. The task force did not specifically evaluate interventions, including safety, for pregnant or breast- or chest-feeding populations.

The recommendations apply to commercial tobacco cigarettes (including hand-rolled cigarettes) produced for individual consumption regardless of place of manufacture, and do not apply to traditional or ceremonial use. This guideline does not provide recommendations on interventions to promote cessation of other tobacco products (e.g., pouches).

Although this guideline is aimed at primary care providers, the task force recognizes that addressing tobacco-related inequities likely requires a broader range of interest holders to organize cessation efforts strategically so that that those who experience the greatest inequities can be supported to quit smoking. As such, this guideline may also be of use outside of primary care settings (e.g., by the public or policy-makers).

## Recommendations

We have provided recommendations on smoking cessation interventions as a menu of options including behavioural interventions, pharmacotherapy, e-cigarettes, and others. Table 1 provides a summary of recommendations, and the grading of recommendations is described in Box 1. A visual summary of the guideline is available in Figure 1.

We based our recommendations on an overview of Cochrane reviews on smoking cessation interventions;[22] certainty of effects is described in Appendix 1, available at www.cmaj.ca/lookup/doi/10.1503/cmaj.241584/tab-related-content. We identified 22 Cochrane systematic reviews on behavioural interventions, pharmacotherapies, combined behavioural and pharmacotherapy interventions, and other interventions.[22] We updated our search in June 2024, and findings on benefits and harms were consistent with results from earlier searches (Appendix 2, available at www.cmaj.ca/lookup/doi/10.1503/cmaj.241584/tab-related-content). We also conducted a systematic review of primary studies on the benefits and harms of e-cigarettes for smoking cessation that identified 17 randomized controlled trials (RCTs) and 1 cohort study,[23] which we compared with a Cochrane living systematic review on e-cigarettes[24] in January 2025.

We consulted with members of the public as part of guideline development activities. They provided information on patient values and preferences, including the importance of outcomes. Participant characteristics, methodology, and findings are available in Appendix 3 (at www.cmaj.ca/lookup/doi/10.1503/cmaj.241584/tab-related-content). From the participants' perspective, critical benefits for decision-making were smoking cessation and quality of life, and potential harms were rated as important or critical (see Methods) (Appendix 3). After we considered outcome ratings from the public engagement, 2 expert advisers, and task force members, the final outcome list included smoking cessation as a critical outcome. Reduction in smoking, quality of life, adverse events, weight gain, changes in emotional state, and loss of social group were considered important.

Recommendations were primarily driven by data on smoking cessation. Substantial health benefits exist for people who quit smoking, and smoking cessation was the most reported outcome. For all interventions, we considered well-established negative outcomes (e.g., cancer, and cardiovascular and respiratory diseases) that arise if one continues to smoke.

We made overarching recommendations for intervention types, rather than doses, lengths, or rankings, because the overview of

**Table 1: Summary of recommendations for smoking cessation**

| Recommendation* | Estimate of magnitude of benefit over usual care or no intervention† | Certainty in estimated benefit |
|---|---|---|
| **Strongly recommended** | | |
| Smoking status | | |
| As part of good clinical care, providers are expected to be knowledgeable about their patients' smoking status. All people who smoke tobacco cigarettes should be encouraged to stop and be offered 1 or more of the recommended smoking cessation interventions. | Large | High |
| Combination approaches | | |
| Combination behavioural and pharmacotherapy approaches (involving bupropion, cytisine, NRT, or varenicline) | Moderate to large | Low |
| Behavioural | | |
| Advice or education (individual; health care provider; minimal to intensive) | Moderate | Low |
| Counselling (individual; trained smoking cessation counsellor) | Small | Low |
| Counselling (group; trained smoking cessation counsellor) | Small | Low |
| Counselling (telephone hotline; trained smoking cessation counsellor) | Small | Moderate |
| Counselling (telephone; trained smoking cessation counsellor; intensive) | Moderate | Low |
| Mobile phone–based interventions (including SMS component) | Moderate | Low |
| Self-help materials (nontailored or tailored, but no contact) | Small | High |
| Pharmacotherapy | | |
| Bupropion | Small to moderate | Low |
| Cytisine | Moderate | Low |
| NRT (e.g., gum, patch, inhaler; does not include e-cigarettes) | Moderate | Low |
| Varenicline | Large | Moderate |
| **Conditionally recommended** | | |
| Behavioural | | |
| Interactive computer-based or online programs with direct behavioural support | Don't know (dependent on behavioural support provided) | Very low |
| **Conditionally recommended against** | | |
| Behavioural | | |
| Interactive computer-based or online programs without additional support (fully automated or self-directed) | Little to none | Very low |
| E-cigarettes | | |
| E-cigarettes (with nicotine) | Small to moderate | Low |
| E-cigarettes (without nicotine) | Small | Low |
| **Strongly recommended against** | | |
| Pharmacotherapy | | |
| S-adenosyl-L-methionine | Little to none | Very low |
| St John's Wort | Little to none | Low |
| Other therapies | | |
| Hypnotherapy | Don't know | Very low |
| Acupuncture | Little to none | Low |
| Continuous auricular stimulation‡ | Don't know | Very low |
| Laser therapy§ | Don't know | Very low |
| Electrostimulation¶ | Don't know | Very low |

Note: NRT = nicotine replacement therapy, SMS = short message service (i.e., text).
*Interventions are listed in each category in alphabetical order.
†For detailed information about the estimates of benefits and harms for interventions, see Appendix 1 (available at www.cmaj.ca/lookup/doi/10.1503/cmaj.241584/tab-related-content).
‡Using indwelling needles or other means to apply continuous stimulation to the auricle.
§Applying low-level lasers to specific anatomic locations.
¶Applying electrical current to specific anatomic locations on the head.

### Box 1: Grading of recommendations

Recommendations are graded according to the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) system.[21] Whether a recommendation is strong or conditional will depend on considerations such as certainty in estimated effects of an intervention, including magnitude, as well as estimates of how patients value and prioritize outcomes, variability of these estimates, and wise use of resources.

Evidence is graded as high, moderate, low, or very low certainty, based on how likely further research is to change the confidence of the Canadian Task Force on Preventive Health Care in the estimate of effect.

**Strong recommendations**

- Strong recommendations are those for which the task force is confident that the desirable effects of an intervention outweigh its undesirable effects (strong recommendation for an intervention) or that the undesirable effects of an intervention outweigh its desirable effects (strong recommendation against an intervention). A strong recommendation implies that most people will be best served by the recommended course of action.
- Strong recommendations are typically based on high-certainty evidence (i.e., high confidence in the estimate of the effect of an intervention) and may recommend in favour of an intervention (when there is high confidence of net benefit) or against an intervention (when there is high confidence of net harm). However, there are circumstances in which a strong recommendation may be considered based on low- or very low-certainty evidence or when there is absence of evidence or low-certainty evidence of benefit.
- When there is an absence of evidence to provide confidence that there is benefit from implementing a new prevention service or when a conclusion of possible benefit requires a high level of speculation on linkages of uncertain evidence, but there is high certainty that some patients would be harmed or scarce health care resources expended, the task force may make a strong recommendation against service implementation. This is consistent with the GRADE approach, in which strong recommendations are sometimes made with low-certainty evidence combined with high certainty of harm or resource implications, and with the value that the task force places on using scarce primary care resources wisely.

**Conditional recommendations**

- Conditional recommendations are those for which the desirable effects probably outweigh the undesirable effects (conditional recommendation in favour of an intervention) or undesirable effects probably outweigh the desirable effects (conditional recommendation against an intervention) but appreciable uncertainty exists. Conditional recommendations are made when the certainty of evidence is lower, when the margin between desirable and undesirable consequences is small and the balance depends on patient values and preferences, or when there is high variability in the values and preferences of patients. Conditional recommendations may also be applied when the balance of cost and benefits is ambiguous, key organizational interest holders differ about the acceptability or feasibility of the implementation, or the effects on health equity are unclear.
- In certain cases where a conditional recommendation for an intervention is made, clinicians are encouraged to engage in shared decision-making, to recognize that different choices will be appropriate for individual patients, and to help each person arrive at a management decision consistent with their values and preferences. Clinicians should recognize that different choices will be appropriate for different patients and that decisions must be consistent with each patient's values and preferences.*

*Knowledge translation tools are available on the task force website, at www.canadiantaskforce.ca, to facilitate decisions that are evidence informed and aligned with a person's priorities.

reviews approach that we used limited our ability to make detailed recommendations for each intervention individually. The task force also considered that many people who smoke will attempt multiple different interventions before finding an approach that works best for them, and that patient preferences (e.g., desire to avoid medication), expressed through shared decision-making, are more likely to drive individual decisions about smoking cessation than knowing which interventions may be optimal compared with others.

## Smoking status

*As part of good clinical care, providers are expected to be knowledgeable about their patients' smoking status. We recommend that all people who smoke tobacco cigarettes be encouraged to stop and be offered 1 or more of the recommended smoking cessation interventions (strong recommendation, high certainty).*

People who smoke should be engaged in shared decision-making about which interventions to use. With shared decision-making, health care providers engage in a collaborative process to help people who smoke to make choices that align with evidence and their own values and preferences.[25]

## Interventions

We strongly recommend several behavioural, pharmacotherapy, and combined interventions, where there was evidence of benefit for smoking cessation. We conditionally recommend behavioural interventions that had uncertain evidence or depended on the extent of additional support provided. We strongly recommend against several interventions where data on effectiveness for smoking cessation were lacking. In addition to these recommendations, which are shown in Table 1, we made a specific recommendation on e-cigarettes.

*We suggest against using e-cigarettes for smoking cessation except in certain circumstances (conditional recommendation, low certainty).*

For people who have unsuccessfully attempted other interventions, are otherwise unwilling to try other interventions, or express a strong preference, practitioners may engage in shared decision-making regarding the possible use of e-cigarettes with or without nicotine. People who decide to use e-cigarettes to quit smoking should be informed of the uncertainties related to e-cigarettes. These include the lack of approved therapeutic products with consistent formulations, the lack of long-term

# Recommendations on interventions for tobacco smoking cessation in adults in Canada

## RECOMMENDATIONS

- **Know** your patients' smoking status
- **Encourage** all patients who smoke to quit
- **Offer** 1 or more recommended smoking cessation interventions
- **Engage** in shared decision-making to determine best option(s)

## Interventions

### Strongly recommended

- **Behavioural**
  - Primary care advice
  - Individual or group counselling by trained cessation counsellor (in person or by telephone)
  - Text messaging interventions
  - Self-help materials
- **Pharmacotherapy**
  - Bupropion
  - Cytisine
  - Nicotine replacement therapy (patch, gum, lozenges, inhaler and/or spray)
  - Varenicline
- **Combined behavioural and pharmacotherapy interventions**

### Conditionally recommended

- Interactive computer-based or online programs with direct behavioural support

### Strongly recommended against

- Acupuncture
- Hypnotherapy
- Laser therapy
- Continuous auricular stimulation
- Electrostimulation
- St. John's Wort
- S-adenosyl-L-methionine

### Conditionally recommended against

- Interactive computer-based or online programs without additional support
- E-cigarettes*

**We suggest against using e-cigarettes,* except in people who:**

- have unsuccessfully tried other interventions
- are unwilling to try other interventions
- express a strong preference for e-cigarettes

No e-cigarettes have been approved for smoking cessation in Canada.

*With or without nicotine.

**Figure 1:** Summary of the guideline recommendations. See Related Content tab for accessible version.

safety data, and that ongoing use of e-cigarettes with nicotine does not address their addiction to nicotine, as it would continue to be consumed.

## Benefits of interventions

### Behavioural interventions

Our overview of reviews[22] found several behavioural interventions that effectively increased cessation, including brief advice from a health care provider (26 RCTs, *n* = 22 239; 36 more people stopped smoking per 1000, 95% confidence interval [CI] 28 to 46 more). Individual counselling (27 RCTs, *n* = 11 100; 40 more per 1000, 95% CI 28 to 54 more) and group counselling (9 RCTs, *n* = 1098; 108 more per 1000, 95% CI 54 to 186 more) were also effective, whether delivered in person or by telephone from a trained counsellor. Mobile phone short message service (SMS) interventions also increased cessation (12 RCTs, *n* = 11 885; 37 more per 1000, 95% CI 26 to 50 more). Other effective behavioural interventions were self-help materials: nontailored without face-to-face contact (11 RCTs, *n* = 13 241; 10 more per 1000, 95% CI 2 more to 19 more), nontailored with face-to-face contact (4 RCTs, *n* = 2822; 18 more per 1000, 95% CI 1 to 41 more), and tailored (10 RCTs, *n* = 14 259; 20 more per 1000, 95% CI 11 more to 31 more).

Data on interventions delivered online with or without additional support (e.g., online access to smoking cessation counsellors) were very uncertain.[22]

### Pharmacotherapy and combined behavioural and pharmacotherapy interventions

Effective pharmacotherapy options were bupropion (4 RCTs, *n* = 404; 128 more per 1000, 95% CI 38 to 268 more), cytisine (2 RCTs, *n* = 937; 64 more per 1000, 95% CI 22 to 147 more), NRT (8 RCTs, *n* = 3081; 44 more per 1000, 95% CI 22 to 73 more), and varenicline (27 RCTs, *n* = 12 625; 138 more per 1000, 95% CI 118 to 159 more). Combined pharmacologic and behavioural approaches were also effective (52 RCTs, *n* = 19 488; 71 more per 1000, 95% CI 58 to 84 more).

One RCT (*n* = 120) provided very low-certainty evidence for the effect of S-adenosyl-L-methionine on smoking cessation (38 fewer per 1000, 95% CI 95 fewer to 134 more).[26] Two RCTs (*n* = 261) reporting on St. John's Wort for smoking cessation found that the intervention may result in fewer smokers quitting (10 fewer per 1000, 95% CI 40 fewer to 83 more), compared with placebo, although there was very serious imprecision.[22]

### Other interventions

Data on hypnotherapy, continuous auricular stimulation, laser therapy, and electrostimulation were all very uncertain. Acupuncture may have little to no effect on cessation (11 RCTs, *n* = 1892; 11 more per 1000, 95% CI 15 fewer to 43 more).

### E-cigarettes

One RCT (*n* = 657)[27] found that nicotine e-cigarettes with behavioural support may result in a small smoking cessation benefit compared with non-nicotine e-cigarettes with behavioural support (32 more per 1000, 95% CI 19 fewer to 196 more; low certainty). A second RCT (*n* = 999) found that nicotine e-cigarettes with behavioural support and nicotine patch access likely results in a small cessation benefit compared with non-nicotine e-cigarettes with behavioural support and nicotine patch access (30 more per 1000, 95% CI 1 more to 79 more; moderate certainty).[28] This RCT found that there may be a moderate cessation benefit when nicotine e-cigarettes with behavioural support and nicotine patch access were compared with nicotine patch and behavioural support alone (46 more per 1000, 95% CI 2 fewer to 200 more; low certainty).

Six other studies that examined similar comparisons (sample size 80–837) reported on smoking cessation and reduction but were all of very low certainty.[29–35] One RCT that compared nicotine e-cigarettes to NRT (*n* = 135) suggested there may be a large effect of e-cigarettes on cessation (161 more per 1000, 95% CI 15 more to 785 more; low certainty); however, we had concerns regarding the extremely wide CI and generalizability of the study design to practice.[36] Another RCT (*n* = 624) examined non-nicotine e-cigarettes with behavioural support and nicotine patch access versus behavioural support and nicotine patch access alone.[28] Non-nicotine e-cigarette use may result in a small cessation benefit (16 more per 1000, 95% CI 12 fewer to 109 more; low certainty). Two other studies that examined similar non-nicotine e-cigarette comparisons (*n* = 249 and *n* = 140) were of very low certainty.[29,30]

Overall, RCTs[27–29,31–39] examining benefits for smoking cessation of e-cigarettes suggested that e-cigarettes with nicotine may provide a small to moderate cessation benefit at 6 months' follow-up compared with non-nicotine e-cigarettes or no intervention, with behavioural support or NRT access provided in both groups.[23] Non-nicotine e-cigarette use may result in a small cessation benefit (Appendix 1).[23]

There were minor differences in study inclusion criteria and the meta-analyses undertaken between our review and the Cochrane living systematic review on e-cigarettes, likely because our review was focused on primary care settings; however, conclusions on effects aligned.[23,24]

## Harms of interventions

### Behavioural interventions

No data on harms were identified in our overview of reviews for practitioner advice, individual or group counselling from a trained smoking cessation counsellor, self-help materials, or Internet interventions.[22] Data on mobile phone SMS interventions suggested little to no harms (1 RCT, *n* = 1075; 6 fewer car accidents per 1000, 95% CI 21 fewer to 18 more; 5 more with pain in thumb or finger joints per 1000, 95% CI 15 fewer to 33 more; low certainty).[40]

### Pharmacotherapy and combined behavioural and pharmacotherapy interventions

Our review showed that bupropion may result in little to no harm, although data were of very low certainty or could not be evaluated for certainty because not enough data were provided.[22]

An updated Cochrane review on bupropion[41] suggested there may be a small increase in adverse events, which could constitute a small harm (Appendix 1 and Appendix 2). There were similar rates of mild adverse events (e.g., nausea, restlessness, insomnia, irritability) across groups in trials of cytisine based on our initial overview.[22] However, an updated Cochrane review on cytisine[42] suggested there may be a small increase in adverse events, which could constitute a small harm (4 RCTs, *n* = 4052; risk ratio 1.22, 95% CI 1.07 to 1.39 for adverse events such as nausea, dry mouth, sleep dysfunction; certainty not evaluated) (Appendix 1 and Appendix 2). Nicotine replacement therapy likely results in a small harm from increased palpitations or chest pains (15 RCTs, *n* = 11 074; 12 more per 1000, 95% CI 5 to 21 more; moderate certainty), but may result in little to no harm from other adverse events, such as hiccups, gastrointestinal disturbances, skin irritation from patches, throat irritation, or runny nose.[43]

Varenicline results in small harms from increases in nausea (32 RCTs, *n* = 14 963; 192 more per 1000, 95% CI 169 to 216 more; high certainty), insomnia (29 RCTs, *n* = 14 447; 41 more per 1000, 95% CI 29 to 54 more; high certainty), abnormal dreams (26 RCTs, *n* = 13 682; 64 more per 1000, 95% CI 50 to 79 more; moderate certainty), headaches (25 studies, *n* = 13 835; 17 more per 1000, 95% CI 7 to 30 more; high certainty), and serious adverse events (26 RCTs, *n* = 15 000; 6 more per 1000, 95% CI 0 to 12 more; high certainty);[44] however, most serious adverse events were considered by trial authors to be unrelated to treatment. Studies found little to no difference in depression (36 RCTs, *n* = 16 189; 1 fewer per 1000, 95% CI 6 fewer to 3 more; high certainty) or suicidal ideation (24 studies, *n* = 11 139; 2 fewer per 1000, 95% CI 4 fewer to 0; high certainty).[44]

No data on harms were identified in our overview of reviews for combined pharmacotherapy and behavioural interventions, nor for St. John's Wort and S-adenosyl-L-methionine.[22]

#### Other interventions

No evidence on harms was identified for hypnotherapy, acupuncture, continuous auricular stimulation, laser therapy, or electrostimulation.[22]

#### E-cigarettes

Fourteen RCTs[27–31,33,34,36,37,39,45–48] and 1 cohort study[49] provided data on e-cigarette harms, almost all at 3–6 months of follow-up. They found little to no difference in adverse events (e.g., dry mouth or throat, nausea, headache, insomnia, irritability, cough, shortness of breath) compared with control groups. Adverse events occurred at similar rates of 2%–7% in both intervention and control groups in 2 RCTs (*n* = 999 and *n* = 300).[28,39] In another study, both intervention and control groups had 80%–86% reporting at least 1 adverse event;[27] *n* = 657; low-moderate certainty). There were also similar rates of serious adverse events (no treatment-related events in 2 RCTs; *n* = 657 and *n* = 999; low certainty[27,28]), and magnitudes of weight gain for both nicotine and non-nicotine e-cigarettes.[28] One RCT provided data on adverse events at 12 months that was of very low certainty,[39] and a cohort study reported no serious adverse events or differences in smoking-related diseases at 4 years with nicotine e-cigarettes compared with traditional tobacco smoking (certainty could not be evaluated).[49] Conclusions from the Cochrane living systematic review on potential harms were similar.[24]

### Resource use

Many behavioural interventions are covered by provincial and territorial health care systems or otherwise provided at no charge (e.g., quit lines), and every province and territory has at least limited coverage or rebate programs for pharmacotherapy, including NRT, which is considered a natural health product.[50–53] However, people may have to pay out of pocket for some behavioural services or pharmacotherapy. Cytisine is approved as a natural health product but, unlike NRT, it is not covered.[51,54] No province or territory has coverage of e-cigarettes for smoking cessation.[55] Net costs for people who successfully stop smoking are reduced through savings in costs of cigarettes. We did not assess costs to health care systems, but others have established that stop-smoking programs are cost-effective.[56–64]

### Feasibility, acceptability, and equity

#### Feasibility

Behavioural and pharmacotherapy smoking cessation interventions are commonly provided in primary care in Canada, and e-cigarettes are already used by many people for smoking cessation.[19,66] Thus, selecting a suitable intervention is anticipated to be feasible, although there may be cost barriers for some interventions. Limited coverage for pharmacotherapy and counselling and limited access to primary care could affect feasibility for some people.[50,51]

#### Acceptability

Most people who smoke cigarettes have some interest in quitting, and many have accessed behavioural or pharmacologic cessation assistance.[19,66] This implies acceptability to people who smoke and to providers, although adverse effects of pharmacotherapy may be a concern for some.[67,68]

Using e-cigarettes for smoking cessation may be acceptable to some people, given that many are already using them for this purpose[19,66] and because of the benefits of potential cessation compared with harms of continued smoking. However, the lack of consistently formulated and approved e-cigarette products and data on long-term safety may be an important deterrent for some people and practitioners.

#### Equity

Inequities in harms caused by tobacco use are likely the result of multiple social determinants of health, access to tobacco products, tobacco industry influence, broader tobacco control policies, and availability of cessation aids.[9,69] Use of effective interventions recommended in this guideline, if they are accessible and delivered in a culturally safe manner, may address some but

not all contributors to tobacco-related health inequities. Barriers such as cost and access to interventions, including culturally compatible interventions, limit the potential for benefit in the most marginalized groups, and could even worsen smoking-related health inequity. Those at highest risk of smoking-related harm have the greatest potential to benefit; however, if uptake is relatively higher in socially advantaged groups, health disparities may be increased further.

## Rationale

### Behavioural interventions

Primary care practitioner advice, individual or group counselling in person or by telephone from a trained cessation counsellor, mobile phone text messaging interventions, and self-help materials all provide at least a small benefit for smoking cessation (Appendix 1). Although most data on benefits were of low certainty, the consistency in direction of effects across similar interventions provided greater overall certainty in the balance of benefits and harms. Few to no harms were identified for behavioural interventions, and feasibility, acceptability, and equity considerations were largely favourable. As such, the task force recommends strongly in favour of these behavioural interventions, which demonstrated at least a small but important benefit for smoking cessation.

Available data for interactive Internet-based interventions without additional personal support (i.e., involving interaction only between the individual and the website or app) were very uncertain as to potential benefits. Thus, the conditional recommendation against using them considers the resource implications and opportunity costs if people who smoke use these interventions instead of behavioural interventions with evidence of effectiveness. Although the evidence for Internet-based interventions with additional behavioural support (i.e., involving 2-way interaction between the individual and a website or app, plus a mechanism to access support from a nurse or other provider) was very uncertain, it showed a point estimate similar to other behavioural interventions. The task force judged that Internet-based interventions that include effective behavioural support may provide a benefit and, therefore, makes a conditional recommendation in favour.

### Pharmacotherapy and combined behavioural and pharmacotherapy interventions

Bupropion, cytisine, NRT, varenicline, and combined pharmacologic and behavioural approaches increased smoking cessation (Appendix 1). The harms identified for these interventions included increases in adverse events, the magnitudes of which were considered to represent small but important harms. Feasibility, acceptability, and equity considerations also largely favoured these interventions. Given the low-to-moderate certainty of increased smoking cessation versus the small harms from adverse events of medications, and considering the large harms of continued smoking, the task force recommends strongly in favour of pharmacotherapies that increase cessation.

The task force also strongly recommends combined behavioural and pharmacotherapy interventions. The evidence for combined interventions was primarily from behavioural interventions combined with NRT or bupropion, but the results likely also apply to varenicline[70] and may also apply to cytisine, in the judgment of the task force. The magnitude of benefit may vary depending on the pharmacotherapy used in combination.

There are harms associated with unsuccessful attempts to quit and continuing to smoke, given the prolonged exposure to tobacco smoke. Because there are therapies with evidence of favourable benefit-to-harm profiles, using therapies with very uncertain evidence of effectiveness is an important opportunity cost in that a potentially effective intervention is not attempted. In addition, public resources could be consumed unnecessarily if interventions without evidence of benefit were implemented as alternatives to effective therapies.[71] A strong recommendation is therefore made against St. John's Wort and S-adenosyl-L-methionine, based on the lack of evidence of benefit, as well as resource implications and opportunity costs if people who smoke use these interventions instead of interventions with evidence of benefit.

### Other interventions

Evidence on the effects on smoking cessation of most other therapies compared with placebo or sham was of very low certainty. In the case of acupuncture, there may be little to no benefit. There was also no evidence on adverse effects identified in our overview of reviews. We therefore make a strong recommendation against offering these interventions.

### E-cigarettes

There may be a small to moderate benefit for cessation with e-cigarettes and little to no harms over the follow-up periods examined in RCTs we reviewed. Important uncertainties also exist. Data on potential long-term harms of e-cigarette use are not available, and both the task force and patients rated harms as important outcomes for decision-making.[23,72] Evidence from trials showed high levels of continued use of e-cigarettes following their use for smoking cessation.[73] A recent analysis of 9 e-cigarette studies found that among people who successfully quit combustible tobacco using e-cigarettes, 70% continued using e-cigarettes at 6 months or longer.[74] For those who continue to use e-cigarettes long term after quitting smoking, there is uncertainty about the health effects. Cessation using e-cigarettes may also lead to dual use of e-cigarettes and tobacco smoking (6% at 6 months in 1 trial[28] and 25% at 1 year in another[73]), meaning that people will continue to be harmed by smoking. Those who do switch to e-cigarettes may be more likely to relapse than those who do not use e-cigarettes for cessation.[75]

Providers cannot direct patients to an approved e-cigarette product with a verified formulation (e.g., for nicotine concentration and other excipients or additives); thus, people will ultimately use what is available to them in the recreational market. Currently available e-cigarettes differ substantially in design and nicotine concentration compared with those examined in RCTs. E-cigarettes are developed to maximize nicotine delivery (e.g.,

via nicotine salts, which make high concentrations of nicotine more palatable[76]), and some e-cigarette brands are now owned by tobacco companies.[77,78]

E-cigarette use with nicotine may reduce harms from smoking but does not address nicotine addiction, given that nicotine may continue to be consumed long term. Although this could also be a concern with NRT, traditional NRT — such as gum or patches — is not typically used recreationally;[79,80] rather, NRT facilitates implementation of a controlled protocol for reducing nicotine over time. The many uncontrolled variables with e-cigarettes (e.g., nicotine formulation, concentration, number of puffs) makes this challenging.

Finally, in the judgment of the task force, there are uncertain public health and societal impacts of normalizing e-cigarettes as a population approach to cessation. The task force is concerned that this could, for instance, inadvertently increase uptake of vaping among youths and nicotine addiction in the general population. Given the large increases observed in youth vaping in recent years,[81,82] the possible impact of recommending e-cigarettes for smoking cessation on this trend is a concern for the task force.

The task force makes a conditional recommendation against e-cigarettes for smoking cessation (v. a strong recommendation against their use) because of well-established harms of continued smoking, and some people may be willing to attempt to quit with e-cigarettes but not with other strategies. Many people are already using e-cigarettes to attempt to quit smoking.[19] For these individuals, the choice may be between attempting to quit using e-cigarettes with advice and support of a health care provider versus doing this alone without informed guidance.

The task force recommends that e-cigarette use not be encouraged as a smoking cessation intervention for most people; rather, people who smoke should be directed toward other interventions with proven effectiveness (i.e., strong recommendation for their use). However, e-cigarettes could be considered for specific individuals based on shared decision-making with their primary care provider.

## Methods

The task force is an independent panel of clinicians and scientists that makes recommendations on primary and secondary prevention in primary care (http://www.canadiantaskforce.ca). A working group of 5 task force members (B.D.T. [chair], D.L.R. [vice-chair], E.L., B.J.W., S.G.) developed this recommendation with scientific support from Public Health Agency of Canada staff and in consultation with content experts on tobacco cessation.

This guideline was developed following the GRADE approach.[21] We adhered to Appraisal of Guidelines for Research and Evaluation (AGREE II), Guidelines International Network (GIN), and Guidance for Reporting Involvement of Patients and the Public (GRIPP-2) reporting guidance.[83–85] More information about the task force's methods is available on the task force website (https://canadiantaskforce.ca/methods/).

### Evidence review and development of recommendations

The recommendation was informed by 2 evidence syntheses that addressed the benefits and harms of smoking cessation interventions. The first review was an overview of Cochrane reviews on the benefits and harms of behavioural, pharmacologic, and other (e.g., acupuncture) therapies.[22] We conducted an overview of Cochrane reviews because there were existing Cochrane reviews of all interventions that would likely be considered and these reviews transparently report assessments of risk of bias and other elements important for assessing evidence certainty; additionally, this approach allowed us to manage the large amount of available evidence on smoking cessation approaches.

Our second evidence synthesis was a systematic review of primary studies on the benefits and harms of e-cigarettes for smoking cessation,[23] which updated an existing Cochrane review from 2016.[86] Although Cochrane has since transformed its review into a living systematic review,[24] it had not yet done so when we developed our evidence review protocol.[87]

The Evidence Review and Synthesis Centre at the University of Ottawa conducted the systematic reviews according to our protocol.[87] Peer-reviewed search strategies (using the Peer Review of Electronic Search Strategies checklist[88]) were conducted in MEDLINE, Embase, PsycINFO, and the Cochrane Library in September 2020. We updated our search for e-cigarettes on Jan. 25, 2024, and because e-cigarettes are an active research area with an evolving evidence base, we conducted another targeted search in PubMed on Jan. 7, 2025, using the terms (Smoking cessation) AND ([e-cigarette] OR [vape] OR [vaping]). To identify updates to Cochrane reviews included in the guideline, we carried out an additional search on June 24, 2024 (Appendix 2).

For the overview, we included Cochrane reviews focusing on smoking cessation interventions that could be directly delivered or referred to by primary care practitioners in Canada, compared with no intervention, placebo, or usual care controls. We excluded reviews if they were not a Cochrane review; did not focus on adults or were focused on interventions targeted to people other than the individual who smokes tobacco; or pharmacotherapies not approved by Health Canada for smoking cessation (e.g., nortriptyline). We also excluded reviews that examined specific behavioural counselling strategies or techniques rather than the effects of counselling in general, and reviews that examined smoking cessation as part of broader lifestyle modifications. Included populations were limited to general populations of people who smoke, those motivated or not motivated, and people with mental illness. Feasibility limited our ability to examine more specific populations. The task force considered the applicability of findings to other populations in developing recommendations.

For the updated systematic review on e-cigarettes, we excluded RCTs if the intervention was not compared with a no intervention or usual care control; the RCTs did not focus on adults; if the intervention being tested included people other than the person who smokes tobacco; or exclusively examined short-term use of e-cigarettes (e.g., < 1 wk).

Outcomes of interest were the same for both reviews. We required potential benefits of interventions to be reported at least 6 months from the quit date or initiation of the intervention if the quit date was not specified. Potential benefits included tobacco use cessation, reduction in tobacco smoking, and quality of life. Potential harms examined included adverse events, weight gain, negative changes in emotional state, and loss of social group.

The working group rated outcomes according to GRADE.[21] Outcomes rated as critical or important by focus group participants (described below) and working group members were considered during guideline development. The working group also used GRADE to determine the certainty of the evidence and strength of the recommendation (Box 1).[21] Appendices 4–7 (available at www.cmaj.ca/lookup/doi/10.1503/cmaj.241584/tab-related-content) provide the evidence-to-decision frameworks the task force used to develop recommendations. Draft recommendations were developed by the working group. The entire task force approved the recommendations.

### Public engagement

We conducted 2 phases of engagement through the Knowledge Translation group at St. Michael's Hospital, Toronto. During phase 1, 19 members of the public (8 identified as men and 11 as women; 1 identified as Indigenous) were engaged to rate potential outcomes being considered by the working group. Participants were recruited via advertisements on the Craigslist and Kijiji websites (Appendix 3). Participants were eligible if they were older than 18 years and identified as someone who currently smokes but is trying to quit, currently smokes but is not planning to quit, or quit smoking within the past year with some form of assistance. Most participants reported that they were smoking daily ($n$ = 13); 1 had quit in the past year (Appendix 3). Between July and August 2018, they completed online surveys to rate outcomes on a scale of 1–9 (1–3 = not important; 4–6 = important; 7–9 = critical) (Appendix 3). This was followed by 3 focus groups (range 4–8 participants), and an individual interview with 1 participant who could not attend the focus groups, to understand participants' rationales for their ratings and factors that influenced their perception of importance of outcomes (Appendix 3).

Outcomes rated as critical or important by both the focus group participants and working group members were considered during guideline development. Benefit outcomes that focus group participants most frequently cited as critical for decision-making were smoking cessation ($n$ = 13) and quality of life ($n$ = 17). All benefit outcomes assessed were rated as critical (medians 7–8 out of 9), whereas harms were rated as important or critical (medians 5–8 out of 9).

In phase 2, 8 members of the public aged 18–75 years (5 identified as women), recruited from the Task Force Public Advisory Network,[89] attended an online education session on a draft version of this guideline (Nov. 2, 2023). In a session a week later, they provided feedback on key messages for the public. After this session, the key public messages were refined by the working group, with additional feedback from phase 2 participants sought via email. Participant characteristics, methodology and findings are available in Appendix 8 (available at www.cmaj.ca/lookup/doi/10.1503/cmaj.241584/tab-related-content).

Clinicians ($n$ = 6) and members of the public ($n$ = 5) also gave feedback on knowledge translation tools to accompany this guideline, developed by the Knowledge Translation Program.

### External and content expert review

The task force engaged 2 content experts who helped to address technical issues and important clinical issues, participated in working group discussions, and reviewed the guideline and key supporting documents. One was a physician–scientist expert in tobacco addiction, including treating populations with a variety of comorbid mental health, addiction, and physical health conditions. The other was a physician–scientist with expertise in implementing tobacco cessation interventions in hospital settings. Task force content experts do not provide input into or vote on direction or strength of recommendations.

The protocol and systematic reviews were externally reviewed by expert peer reviewers and organizational interest holders, with 29 reviewers providing input on the draft version of this guideline. These included clinician researchers in tobacco cessation, provincial and territorial health authorities, advocacy organizations, cancer-specific organizations, professional associations, and guideline development groups (see Acknowledgements).

### Management of competing interests

The task force follows GIN principles for disclosures of interests and management of conflicts of interest.[90,91] The task force's oversight committee for evaluating and adjudicating competing interests consists of the task force chair and vice-chair and the director of the Global Health and Guidelines Division of the Public Health Agency of Canada, which provides funding for the task force.[91] The task force does not consider the views of the funding body in developing its recommendations.

All task force members are required to disclose financial and other relevant interests, and these are available on the task force website (https://canadiantaskforce.ca/about/members/). Clinical and content experts also disclose relevant interests at the outset of their participation and annually thereafter. Information on disclosures and competing interests can be found in Appendix 9 (available at www.cmaj.ca/lookup/doi/10.1503/cmaj.241584/tab-related-content). We did not judge any disclosures to represent competing interests that precluded participation of task force members or clinical experts.

## Implementation

As part of good clinical care, providers are expected to be knowledgeable about their patients' smoking status and should therefore ask patients if they smoke, and advise them to quit if they do. Shared decision-making should be used to help guide patients to interventions, including potential combinations of interventions, that are effective, most closely fit their values and preferences, and are accessible (Table 1). With

shared decision-making, health care providers engage in a collaborative process to help people who smoke to make choices that align with evidence and their own values and preferences, smoking behaviours, and life circumstances.[25] Shared decision-making should not be used to convince a person to choose a specific intervention or group of interventions, but should help to elicit the person's preferences and provide information that allows them to make a decision.[25]

Many people attempt quitting multiple times with different interventions or combinations of interventions before being successful, and may learn from preceding attempts or change their preferences for different interventions.[19] Patients who relapse should be engaged in further shared decision-making to explore options to attempt to quit again, including whether they wish to try something different, or reattempt with the same intervention. What is most important is that people who smoke try something that has been shown to be effective. The menu of effective smoking cessation options identified by the task force can be used to support this process; the intention is not that providers need to discuss each individual option with each person who smokes.

**Table 2 (part 1 of 2): Summary of Canadian and international guidelines for primary care providers on interventions for tobacco smoking cessation***

| Organization | Recommendation |
|---|---|
| Canadian Action Network for the Advancement, Dissemination and Adoption of Practice-informed Tobacco Treatment, Centre for Addiction and Mental Health (2011)[93] | Health care providers should routinely ask patients about their tobacco use, advise patients who smoke to quit, and provide interventions such as brief advice and individual or group counselling (self-help, helpline, Web-based), and combined counselling and medication interventions. |
| United States Preventive Services Task Force (2021)[94] | The USPSTF recommends that clinicians ask all adults about tobacco use, advise them to stop using tobacco, and provide behavioural interventions and US Food and Drug Administration–approved pharmacotherapy for cessation to nonpregnant adults who use tobacco.<br>The current evidence is insufficient to assess the balance of benefits and harms of electronic cigarettes (e-cigarettes) for tobacco cessation in adults, including pregnant people. The USPSTF recommends that clinicians direct patients who use tobacco to other tobacco cessation interventions with proven effectiveness and established safety. |
| National Institute of Health and Care Excellence (2025)[95] | For people who want to stop smoking, discuss with them how they can stop, and provide stop-smoking interventions and advice, including behavioural support (individual and group) and medications (bupropion, cytisine, nicotine replacement therapy, varenicline).<br>Give clear, consistent and up-to-date information about nicotine-containing e-cigarettes to adults who are interested in using them to stop smoking. This includes explaining that e-cigarettes are not licensed medicines but are regulated by the Tobacco and Related Products Regulations (2016); and that there is not enough evidence to know whether there are long-term harms from e-cigarette use. |
| Scottish Intercollegiate Guidelines Network (2017)[96] | Varenicline or combination NRT should be offered alone or as part of a smoking cessation program. Bupropion and single NRT may also be considered. |
| Royal Australian College of General Practitioners (2021)[97] | Identify all people who smoke and offer brief cessation advice and referrals to telephone counselling services to all patients who smoke.<br>In the absence of contraindications, offer pharmacotherapy (NRT, varenicline, or bupropion) in combination with behavioural support to all people who smoke and who have evidence of nicotine dependence. Choose pharmacotherapy based on efficacy, clinical suitability, and patient preference.<br>For people who have tried first-line cessation therapies but failed, and who are still motivated to quit and have brought up e-cigarette usage, nicotine e-cigarettes may be considered. Through shared decision-making, the patient should be informed of the evidence on risks and conditions of use (e.g., only short-term use, avoid dual use with tobacco). |
| New Zealand Ministry of Health (2021)[98] | Recommend counselling (short or more intense), text messaging support, NRT, bupropion, varenicline, nortriptyline, combination pharmacotherapy and behavioural approaches.<br>Recommend vaping products with nicotine, noting that anybody who is switching to vaping should be advised to stop smoking tobacco as soon as possible; that long-term (more than 12 months) effects of vaping products are unknown (however, vaping products are almost certainly less harmful than traditional cigarettes); and that vaping products are intended only for people who smoke. People who do not smoke (especially young people) should be advised not to take up vaping.<br>Suggest use of Internet-based support, vaping products without nicotine. |

**Table 2 (part 2 of 2): Summary of Canadian and international guidelines for primary care providers on interventions for tobacco smoking cessation***

| Organization | Recommendation |
|---|---|
| Haute Authorité de Santé (2022)[99] (translated) | People who smoke should receive clear, complete, and objective information based on evidence about the use of vaping products. As a freely available product for adults, vaping products can be used, by individual choice, outside of or in addition to support for quitting smoking within the context of the health system. However, there is currently insufficient scientific evidence to confirm that vaping products can help to stop tobacco consumption. The effects of vaping products on health are insufficiently known in the short, medium and long term.<br>Vaping products, in a strict approach to stopping smoking, could be used for specific people who smoke and/or vulnerable groups (from co-addiction, comorbidities, social factors, etc.) with high dependence on nicotine; but first-line treatments with a favourable benefit and risk (e.g., NRT) balance must be offered to these populations. The use of vaping products in these cases should be done in the event of failure or poor adherence to treatment and with an expression, on the part of the individual, of a preference for vaping devices. |
| World Health Organization (2024)[100] | WHO strongly recommends that brief advice (between 30 seconds and 3 minutes per encounter) and more intensive behavioural support be offered to all tobacco users interested in quitting. Options for behavioural support are individual face-to-face counselling, group face-to-face counselling, or telephone counselling; multiple behavioural support options should be provided.<br>Digital tobacco cessation modalities (text messaging, smartphone applications, artificial intelligence–based interventions or Internet-based interventions), individually or combined, can be made available for tobacco users interested in quitting, as an adjunct to other tobacco cessation support or as a self-management tool (conditional recommendation).<br>WHO strongly recommends varenicline, NRT, bupropion, and cytisine as pharmacologic treatment options for tobacco users who smoke and are interested in quitting. Varenicline, NRT, or bupropion are recommended as first-line options; combination NRT (a patch plus a short-acting form, such as gum or a lozenge) is an option for tobacco users interested in quitting who will use NRT.<br>Bupropion in combination with NRT or varenicline may be offered to tobacco users interested in quitting when there is inadequate response to first-line treatments (conditional recommendation).<br>WHO recommends combining pharmacotherapy and behavioural interventions to support tobacco users interested in quitting.<br>Evidence is insufficient to make a recommendation for or against traditional, complementary and alternative therapies for tobacco users interested in quitting. (Note that e-cigarettes were out of scope for this guideline.) |

Note: NRT = nicotine replacement therapy, USPSTF = United States Preventive Services Task Force, WHO = World Health Organization.
*See Appendix 10 (available at www.cmaj.ca/lookup/doi/10.1503/cmaj.241584/tab-related-content) for more detail.

The task force recognizes that individual preferences for interventions (e.g., medication v. behavioural interventions) will vary, as well as other factors affecting choice of intervention (e.g., cost, accessibility) and that there is not a single best choice for all patients. This guideline discourages the use of interventions without evidence of benefit; providers should encourage people who smoke to select a recommended intervention without discouraging them from attempting to quit.

The task force recommends that e-cigarette use not be routinely encouraged as a smoking cessation intervention and that people who smoke ideally be directed toward other interventions with proven effectiveness and strong recommendations. However, for people who have already unsuccessfully attempted other interventions, are otherwise unwilling to try other interventions, or express a strong preference, primary health care providers may engage in shared decision-making regarding the possible use of e-cigarettes (with or without nicotine). People who wish to use e-cigarettes to quit cigarette smoking should be informed about the benefits and uncertainties. Although switching entirely to e-cigarettes may reduce harms from smoking, uncertainties exist related to e-cigarettes and their long-term safety for people who continue to use them longer term after quitting combustible tobacco. They should also be informed that e-cigarettes may not address nicotine addiction if the person continues to consume nicotine.

Knowledge translation tools to support implementation of this guideline can be found on the task force website (https://canadiantaskforce.ca/guidelines/published-guidelines/tobacco-smoking-in-adults/) .

## Monitoring and evaluation

Clinician awareness of this guideline and use of the recommendations and menu to support shared decision-making are performance measures for this guideline. The task force will monitor

evidence related to this guideline following task force methods[92] and will update the recommendations as new evidence that could influence their direction or strength becomes available.

## Other guidelines

Other Canadian and international guidelines recommend behavioural interventions, including brief advice to quit and individual or group counselling, and pharmacotherapy (alone or in combination) for smoking cessation (Table 2; additional details in Appendix 10, available at www.cmaj.ca/lookup/doi/10.1503/cmaj.241584/tab-related-content). Several international guidelines (from the National Institute for Health and Care Excellence, the New Zealand Ministry of Health, the Royal Australian College of General Practitioners, and the Haute Authorité de Santé de France) advise that e-cigarettes may be used for cessation in certain cases but that information should be provided on the risks and uncertainties, including that e-cigarettes are not licensed medicines in most jurisdictions, and that there is a lack of evidence on long-term harms.[95,97–99] The Australian and French guidelines suggest that other therapies should be considered first.[97,99] The United States Preventive Services Task Force judged that the evidence on e-cigarettes was insufficient and recommends directing patients to interventions with proven effectiveness and safety.[94]

## Gaps in knowledge

Large comparative trials[101] will likely refine future recommendations. Studies to enhance knowledge on access and health equity challenges related to tobacco cessation, including for groups such as Indigenous populations or populations that may face barriers to accessing interventions, would also be helpful. Evidence is needed on long-term benefits and harms of e-cigarettes. The use of artificial intelligence in Internet-based or other forms of counselling and its impact on effectiveness is another area for future research.

## Limitations

The overview approach we used for interventions other than e-cigarettes comes with limitations, as we relied on what was reported in the Cochrane systematic reviews. We excluded some meta-analyses from Cochrane reviews (e.g., bupropion, NRT) because they included some RCTs with active controls, and we applied a strict placebo or usual care control criterion. Analyses from these reviews may have improved our certainty in the magnitude of benefits but would not alter our strong recommendation in favour of these interventions.

Network meta-analyses have compared effects within types of behavioural interventions and within pharmacologic interventions,[102,103] but these analyses have been limited to drawing broad conclusions about likely effects of interventions and did not find sufficiently strong evidence to rank intervention options. No syntheses, however, have integrated comparisons across all options, including behavioural and pharmacologic approaches. Trials start with people willing to try the trial intervention, whereas clinicians work with people who may be willing to try some options but not others. The task force developed a menu of options for people to consider, recognizing the importance of patient preference and shared decision-making, rather than carrying out a comparative effectiveness review to rank interventions from best to worst.

The systematic reviews that we included did not provide data on all populations who may be disproportionately affected and did not address cultural considerations in tobacco use and cessation. Guidance on culturally safe care would therefore be complementary to these recommendations.

Our targeted search update, conducted on Jan. 7, 2025, identified 2 potentially relevant trials of e-cigarettes not included in our analyses.[104,105] The task force carefully reviewed both studies. Both showed a potential benefit for smoking cessation and high levels of continued e-cigarette use at the end of the intervention, but presented no long-term safety data, which aligns with the findings of our analysis.[104,105]

The patient engagement activities undertaken for this guideline to assess patient preferences included 19 individuals in phase 1 and 8 in phase 2, and were limited in terms of diversity, so may not be generalizable to the broader population.

The use of emerging nicotine products such as pouches was not included in the scope of this guideline but may be considered for future updates.

## Conclusion

The task force strongly recommends that primary care providers encourage people who smoke to quit by using 1 or more recommended interventions. The menu of effective options included in the guideline can be used during shared decision-making to identify the most suitable interventions for people who smoke.

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