Interventions to Prevent Harms from Vaping

Report for the Central East TCAN

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Abstract

The purpose of this review is to explore the current state of knowledge on vaping interventions and to highlight best or promising practices. Academic and grey literatures were reviewed to identify intervention type, targeted population, and measured effectiveness. The search returned limited interventions from Canada but a variety of interventions from other jurisdictions, primarily the United States. Most interventions observed were public education and school-based efforts, which typically were designed to teach youth about the dangers of vaping in the hopes that they refrain from initiating vaping or subsequently stop vaping. Other interventions included community-based interventions, public education, health-care provider interventions, aerosol-free policies, age restrictions, flavour restrictions, advertising and promotion restrictions, labelling and health warnings, and safety requirements. Many of the interventions were embedded in existing tobacco control programs. In most cases, there was insufficient evidence to assess the effectiveness of these interventions to prevent/reduce levels of vaping. Interventions that have been successful at reducing rates of cigarette smoking might hold potential for reducing e-cigarette use and merit future investigation. A preliminary vaping path logic model is one step toward a coordinated and planned vaping strategy.
Interventions to Prevent Harms from Vaping

In 2009, e-cigarettes began to enter the Canadian market. That same year, Health Canada issued an advisory warning of the dangers of nicotine e-cigarettes devices, stating that there was a lack of evidence available to support their safety. More recently, a report from the US National Academies of Science, Engineering and Medicine has stated that the evidence reviewed by the committee suggests “e-cigarettes are not without biological effects in humans”, with dependence being one result of continued use.

With the recent passage of the federal Tobacco and Vaping Products Act in May 2018, vaping products containing nicotine are now allowed to be sold in Canada (prior to enactment, vape products containing nicotine were illegal for sale). One result has been an increase in vaping devices containing nicotine entering the Canadian/Ontario market, in particular at local convenience and gas stations. In September of 2018, JUUL—a company with approximately 75% market share of vaping devices in US chain convenience stores and gas stations—introduced their brand into the Canadian market. Likewise, Imperial Tobacco Company released Vype in the spring of 2018, and Japan Tobacco released Logic in early 2019.

Figure 1 shows a selected timeline of the history of e-cigarettes in Ontario.

With this surge of e-cigarette availability at the local level, as well as the associated marketing and promotion of these nicotine containing products, public health representatives have growing concerns about the rise in vaping among young never-smokers. Given this environment, public health organizations have begun to plan and enact interventions to combat this growing epidemic. One critical avenue recognized by local authorities is the need to examine what other leading jurisdictions have done in implementing a public-health response to the uptake of e-cigarette products. To that end, this report reviews the current state of knowledge regarding vaping interventions. Specifically, academic and grey literature were reviewed to identify intervention type, targeted population, and measured effectiveness. This review highlights best or promising interventions that might apply to public health in Ontario and establishes a framework to organize these interventions (a path logic model) and provide a direction for next steps.

1 In late 2018, Altria—the parent company of Phillip Morris and Rothmans, Benson & Hedges—purchased a 35% share in JUUL.
Interventions to Prevent Harms from Vaping

Figure 1: E-Cigarette Timeline, Select Highlights from the United States, Canada, and Ontario, 2007 to 2019

- **2007**: E-cigs enter US market
- **2008**: E-cigs enter CDN market
- **2009**: 17.5% past year vape (7 to 12)
- **2010**: 18.7% past year vape (7 to 12)
- **2011**: Intro of Vype (Spring), JUUL (Fall)
- **2012**: Intro of Logic (Winter)
- **2013**: Tobacco & Vaping Products Act
- **2014**: Smoke-Free Ontario Act
- **2015**:
- **2016**:
- **2017**:
- **2018**:
- **2019**:
Methods

Review of Academic and Grey Literature

We systematically searched the published academic literature and grey literature databases for information about interventions to prevent harms from e-cigarette vaping. The focus was on interventions to prevent vaping initiation, inclusive of restrictions on places where vaping is allowed. Vaping for the purpose of smoking cessation was not excluded, but we did not search systematically for interventions in this area.

The academic literature search yielded almost no studies of the effectiveness of interventions to prevent harms from vaping. Most of the relevant publications included policy recommendations stemming from studies on e-cigarette use.

The grey literature search produced several creative and promising interventions. However, little information exists about the effectiveness of these interventions. The grey literature search plan was developed to incorporate the following search strategies:

- Customized Google searches
- Targeted websites
- Consultation with experts/key informants

These strategies were loosely adapted from those used in a systematic review of grey literature methodology. Search techniques included hand-searching and data saturation. A data extraction form was used to manage the search results.

The first search strategy involved conducting Google searches for documents or websites readily available on the Internet. Due to the relevancy ranking involved with a Google search, several search strategies containing multiple combinations of search terms were used. The first three pages for each search's hits were reviewed, using the title and short description. Relevant sources were reviewed and, if appropriate, data were extracted and inputted into the data extraction form.
The second search strategy involved browsing targeted websites of known health organizations and agencies.

The final search technique involved contacting content experts to identify additional information about relevant interventions, other potential items for inclusion and any program evaluation data if available. Nine content experts were contacted by email on January 14, 2019 to seek clarification and to provide additional details.

**PHU and TCAN Survey**

OTRU circulated a survey to TCAN co-ordinators who, in turn, circulated it to public health units within their TCAN. The survey asked for a brief description of existing e-cigarette interventions by pillar (prevention, protection, and cessation) and the materials developed.
Results

Our search yielded interventions in 10 content areas including:

- School-based interventions
- Community-based interventions
- Public education
- Health-care provider interventions
- Aerosol-free policies
- Age restrictions
- Flavour restrictions
- Advertising and promotion restrictions
- Labelling and health warnings
- Safety requirements

Interventions our review uncovered from jurisdictions outside of Ontario are described below.

Interventions

1. School-Based Interventions

We identified four potential types of school-based interventions:

1. School policy
2. Curricular
3. Bans on e-cigarette use
4. Education/training targeted to school authorities

Policy recommendations from the published literature regarding school policies include prohibiting e-cigarette use:

- On school property
- In private vehicles parked at school
- Within a specific distance of the school
- At sponsored events off school grounds
Six interventions identified in the grey literature provide a variety of promising approaches (Table 1). Additional details on these interventions are provided in the text below the table.

### Table 1: School-Based Interventions

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Description</th>
<th>Jurisdiction</th>
<th>Population</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Tobacco Prevention Toolkit</strong></td>
<td>Toolkit to be delivered by educators and aimed toward tobacco, e-cigarettes, and vaping</td>
<td>US (but available online)</td>
<td>For middle and high school students</td>
<td>Stanford University (School of Medicine)</td>
</tr>
<tr>
<td><strong>CATCH My Breath Youth E-cigarette Prevention Program</strong></td>
<td>Provides schools with a free curriculum for middle and high schoolers to educate them on vaping</td>
<td>US (but available online)</td>
<td>Ages 11-18</td>
<td>CATCH (Coordinated Approach to Child Health)</td>
</tr>
<tr>
<td><strong>Get Smart About Tobacco - Health and Science Education Program</strong></td>
<td>Provides educators and schools with lessons, posters, hands-on experiments and fact sheets about smoking (includes e-cigs)</td>
<td>US (but available online)</td>
<td>For students in grades 3-7</td>
<td>Scholastic</td>
</tr>
<tr>
<td><strong>E-Cigarettes: What You Need to Know (Teacher’s Guide)</strong></td>
<td>Provides teachers with resources and student materials about e-cigarettes</td>
<td>US (but available online)</td>
<td>For students in grades 6-12</td>
<td>Scholastic</td>
</tr>
<tr>
<td><strong>Vaping and JUULING Lesson Plans</strong></td>
<td>Curriculum for teachers to educate about the harms of vaping</td>
<td>US (but available online)</td>
<td>For middle and high school students</td>
<td>Physician Advocacy Network</td>
</tr>
<tr>
<td><strong>School E-cigarette Toolkit</strong></td>
<td>Provides tools and resources to address vaping products in schools</td>
<td>Minnesota</td>
<td>School staff, for students</td>
<td>Minnesota Dept. of Health</td>
</tr>
</tbody>
</table>

### Tobacco Prevention Toolkit

The Tobacco Prevention Toolkit from Stanford Medicine is available to the public for free and contains a specific module focused on e-cigarettes/vapes/pod-based systems, as well as information and resources on nicotine addiction and positive youth development. The toolkit covers basic information about what e-cigarettes/vapes are, chemicals found in vapes and e-juices, and differentiates between the terms vapor and aerosol. Additional topics include the potential health consequences of using e-cigarettes/vapes including thirdhand smoke, advertisements for pod-based systems and how these ads influence youth/young adults. The toolkit provides additional discussion guides and handouts for educators to help students brainstorm how they can say no to using tobacco products and vapes and develop refusal skills. Toolkit users are encouraged to modify the materials to suit their needs, however, all users must follow a Terms of Use to preserve the toolkit logo and material.

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7 We thank City of Hamilton Public Health Services for identifying the School E-cigarette Toolkit intervention.
In order to measure the effectiveness of the program, Stanford University is currently collecting evaluation data through pre-post surveys, Google Analytics and a randomized control trial. Preliminary results are expected to be available mid-2019.

**CATCH My Breath Youth E-cigarette Prevention Program**
The CATCH My Breath Youth E-cigarette Prevention Program targets students aged 11-18 years old and is free of cost. The program goal is to increase student knowledge of e-cigarettes, nicotine, addiction and the related dangers. With an increase in knowledge, the program assumes that youth will develop skills to resist media influences and peer pressure to initiate e-cigarette use.

The program content is based on best practices for tobacco awareness. CATCH My Breath offers a curriculum composed of four lessons (PowerPoint format), each providing approximately 30 minutes of instruction. Secondary to the curriculum, the program offers in-class activities, teacher education, online resources and take-home material intended for parents (Appendix A contains a sample take-home activity).

The program content includes information about e-cigarettes including potential harms and adverse health effects, understanding marketing strategies targeted at youth, and techniques to develop refusal skills. The program content was developed by the University of Texas Health Science Center at Houston School of Public Health.

The content was developed to be taught by school educators and to provide parents with information to support the lessons learned in class. CATCH My Breath has developed an hour-long training module, delivered online via webinar, for educators who intend to implement the program.

In 2016, pilot data was collected from 26 schools (2,255 students in grades 6-8) across 5 states. Important findings from the pilot data include:

- 91% of teachers agreed or strongly agreed that the lessons were culturally appropriate for their students
- 91% of teachers agreed or strongly agreed that they felt confident in their ability to teach the curriculum
- 68% of teachers agreed or strongly agreed that their students enjoyed the lessons
Interventions to Prevent Harms from Vaping

- 86% of students are less likely to use e-cigarettes after completing the program
- 86% of students know more about e-cigarette use after completing the program
- 82% of students will look at e-cigarette ads differently
- 70% of students discussed what they learned with family or friends

Get Smart About Tobacco
The Get Smart About Tobacco initiative is a health and science education program designed by Scholastic for teachers Get Smart About Tobacco in Grades 3 to 7. This initiative, based on lessons in the classroom, includes educational information and worksheets on tobacco and e-cigarettes and the potential dangers (Appendix B contains a sample worksheet). The initiative also includes critical-thinking discussion questions about e-cigarettes such as “Why is it sometimes difficult to make health decisions about e-cigarettes?” “How do you think people’s attitudes about electronic cigarettes will change over time?” and “Why might teens not know the risks of e-cigarettes?” Answers are provided for the discussion questions although there is no indication what source of information was used to develop the answers. Pre- and post-assessment survey tools are available to teachers, who can submit results to Scholastic for the chance to win a Scholastic gift certificate (results of the surveys are not known).

E-Cigarettes: What You Need to Know (Teacher’s Guide)
Scholastic’s Teacher’s Guide is designed for teachers in Grades 6 to 12. It includes informational text and articles for students, student worksheets, critical-thinking questions (including answer keys), vocabulary lists, and reading suggestions. This initiative addresses key educational standards including English language arts (e.g., textual evidence, writing informative texts), science (e.g., chemical processes in everyday life), education (e.g., personal and community health) and social studies (e.g., production, distribution, and consumption).

Vaping and JUULING Lesson Plans
The Physician Advocacy Network developed Vaping and JUULing Lesson Plans for middle and high school teachers to teach students about the harms of vaping. The content is a combination of a lesson plan for teachers to follow and a PowerPoint slide deck to guide in-class instruction (Appendix C contains the lesson plan). No evaluation data are being collected. The Physician Advocacy Network simply provides the PowerPoint to educators for use in their classrooms.\textsuperscript{8}
School E-cigarette Toolkit

The Minnesota Department of Health’s School E-cigarette Toolkit is for school staff including administrators, educators, teachers and health-services staff. The toolkit aims to educate users on e-cigarettes and nicotine and provides information on the following topics: reviewing and strengthening current policies, updating curriculum/lesson plans, promoting resources for parents, promoting health messaging in schools, and educating students.

2. Community-Based Interventions

Recommendations from the formal literature relevant to community-based programming include stronger enforcement of youth access laws, online marketing, and age verification to alter the perception that these products are easy to access. The grey literature search produced only one community-based intervention (Nicotine Anonymous Meetings), which we categorized as a cessation program. In a recent webinar sponsored by the US Substance Abuse and Mental Health Services Administration (SAMHSA), Donna Vallone, from the Truth Initiative, discussed three online digital platforms from TRUTH that seek to support e-cigarette quitters of all ages (Table 2).

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Description</th>
<th>Jurisdiction</th>
<th>Population</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicotine Anonymous Meetings</td>
<td>Meetings based on the 12-step program adapted from AA. The purpose is to help individuals who want to stop using nicotine products</td>
<td>US and Canada (Ontario, Saskatchewan, BC)</td>
<td>Adults</td>
<td>Nicotine Anonymous</td>
</tr>
<tr>
<td>This is Quitting</td>
<td>Text message program, digital resources</td>
<td>US</td>
<td>Vapers 17 years or older</td>
<td>Truth Initiative</td>
</tr>
<tr>
<td>BecomeAnEX</td>
<td>Email/text message program, digital resources</td>
<td>US, but open to anyone</td>
<td>Vapers</td>
<td>Truth Initiative</td>
</tr>
<tr>
<td>EX Program</td>
<td>Text message program, digital resources, 1 on 1 chat with treatment specialists and NRT fulfillment</td>
<td>US</td>
<td>Employers and health plans</td>
<td>Truth Initiative</td>
</tr>
</tbody>
</table>

3. Public Education

We identified five types of public education interventions:

- Social media campaigns
Interventions to Prevent Harms from Vaping

- Mass media campaigns
- Video games
- Online courses
- Earned media

Policy recommendations about public education from the formal literature include publishing health information and promotion on social networking sites (e.g., Facebook, Twitter, Instagram, YouTube) to identify and educate adolescents who display, consider, or engage in e-cigarette use. Exposure to risk behaviour on social networking sites has a direct impact on adolescents' risk behaviours.

Ten public education interventions were identified in the grey literature (Table 3), all of which use a variety of approaches including paid ads, social media, and resource guides, and other written material (e.g., posters and fact sheets). More detail is provided on nine of these interventions below the table.

**Table 3: Public Education**

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Description</th>
<th>Jurisdiction</th>
<th>Population</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>smokeSCREEN</strong></td>
<td>An e-cigarette and smoking prevention videogame focusing on peer pressure and decision making</td>
<td>Worldwide - online</td>
<td>Ages 10-16</td>
<td>Yale University - Center for Health and Learning</td>
</tr>
<tr>
<td><strong>The “Real Cost” Youth E-Cigarette Prevention Campaign</strong></td>
<td>Focused on de-bunking myths and provides materials for use in high schools in the United States</td>
<td>US (but available online)</td>
<td>Youth aged 12-17</td>
<td>FDA</td>
</tr>
<tr>
<td><strong>Escape the Vape</strong></td>
<td>Provides education on vaping and chemical contents in a youth/child friendly way</td>
<td>Online website</td>
<td>Youth and Children</td>
<td>Seattle and King County Public Health</td>
</tr>
<tr>
<td><strong>Student online vape &amp; e-cigarette diversion/ educational program</strong></td>
<td>Videos and downloadable material to be used for educational opportunity</td>
<td>US (but available online)</td>
<td>Youth</td>
<td>Chandler Coalition on Youth Substance Abuse (CCYSA)</td>
</tr>
<tr>
<td><strong>Vanish the Vape</strong></td>
<td>The campaign seeks to educate students and families on the consequences and dangers of vaping using presentations, posters, social media and videos</td>
<td>Tempe, Arizona, US</td>
<td>High school students</td>
<td>Tempe Union High School District</td>
</tr>
</tbody>
</table>

We thank City of Hamilton Public Health Services for identifying three of these interventions: Flavors Hook Kids, E-Cigarettes and Teens: A Guide for Parents and Educators, and What You Need to Know and How to Talk with Your Kids about Vaping.
smokeSCREEN

smokeSCREEN is an innovative video game developed by Yale University’s Center for Health and Learning and implemented in 2018. This public-education intervention aims to prevent e-cigarette use by challenging users to work through simulated real-life situations and dangers that can occur when youth vape. The videogame is available online, free of cost, typically takes four hours to complete and targets children and youth aged 10-16.\textsuperscript{10,11}

In the videogame, the player creates a virtual character. The virtual character engages in conversations and events in a school setting. The participant’s goal is to help their character navigate through the difficult situations that he/she encounters (Appendix D contains a sample of the videogame content). The videogame is intended to provide the participant with skills that they can apply in their real lives and to help them avoid e-cigarette initiation.\textsuperscript{10,11}

Short term evaluation data suggests that the smokeSCREEN videogame helps avoid risky behaviours that lead to vaping. Some positive effects have included changes in beliefs, knowledge and intentions regarding e-cigarette use and vaping. Findings suggest that the videogame is a promising intervention to prevent e-cigarette use in youth.\textsuperscript{11}

The “Real Cost” Youth E-Cigarette Prevention Campaign

The “Real Cost” Youth E-Cigarette Prevention Campaign from the FDA focuses on debunking myths about e-cigarette use among youth and is composed of online video ads, digital and social
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media content, and materials for use in high schools such as posters. The campaign uses YouTube, Instagram and Facebook to promote messaging on the dangers of vaping.

The “Real Cost” Smoking Prevention Campaign was successful in reducing cigarette smoking among youth, having prevented 350,000 youth from smoking initiation between 2014 and 2016 alone. In the hopes of reducing the rise in e-cigarette use by youth, the “Real Cost” Campaign was extended and improved to focus on youth vaping.

The vaping-focused campaign launched in 2018 and conveys messages about the risks of using e-cigarettes, the consequences of nicotine on youth development, and the adverse health effects (Appendix E contains a sample poster). The campaign is designed to reach youth online through their social media feeds and in schools through posters and advertisements. The digital and print media were provided to more than 10,000 high schools across the United States and is projected to reach 10.7 million youth who currently use e-cigarettes or have intentions to try them.

The “Real Cost” campaign is rooted in harm reduction principles—by providing youth with the knowledge and education about vaping and e-cigarettes, they will be prepared to make educated decisions.

Links to The “Real Cost” campaign material can be found on Facebook, Instagram and YouTube.

Escape the Vape

Escape the Vape, created by Seattle and King County Public Health, is a publicly available free website designed to inform youth and children about vaping. The website provides information about vaping, the chemical contents of e-juice and the health-related dangers of vaping. The information is provided through use of catchy characters and illustrations, designed to attract children. The accuracy of the information on the website has not been verified.

Vanish the Vape

Implemented in September 2018, Vanish the Vape was developed by Tempe Union High School District. The campaign was developed in response to a high level of vaping in/at schools and with the intent of reducing disciplinary incidents for vaping on campus.
Interventions to Prevent Harms from Vaping

The campaign goals are to a) inform students and families of the consequences of vaping or bringing vaping paraphernalia on high-school campuses, and b) educate students and parents about the dangers of vaping and e-cigarettes. The campaign included handing out flyers at school, providing handouts for parents, the use of videos and educational material (websites), paid advertisements in local newspapers and developing social media campaign content on Facebook, Instagram and Twitter.¹⁵

Data collected between September and December 2018 showed a 30% reduction in vaping related discipline incidents.¹⁵

**Generation FREE**

Mississippi’s Generation FREE is a youth-led campaign to prevent vaping and tobacco use among youth by providing educational information and public service announcements. The campaign is targeted at both high-school and university students. With catchy public service announcements and headlines like “we get it, you vape”, Generation FREE aims to challenge the increasing interest in and normality of vaping. The content is delivered on the campaign’s website and social media accounts including snapchat, Twitter, and Instagram.

**Health Canada**

Health Canada’s vaping campaign includes paid and social media ads urging parents to talk to their children about the health risks associated with vaping (e.g., “Talking with your teen about vaping” fact sheet) and a video directed toward youth with the message, “Consider the consequences of vaping .... It’s your life. Why risk it?” The Health Canada website also includes content about “Resources for parents,” “What is vaping,” “Risks of vaping,” and “Vaping and quitting smoking.” The campaign will include hands-on learning events in high school and community venues, targeting youth between the ages of 13 and 18. Social media influencers will also be part of the campaign to reach parents and teens.

**Flavors Hook Kids**

The Flavors Hook Kids campaign from the California Department of Public Health warns parents and concerned adults about the availability of flavoured tobacco products targeting teens, teens’ ease of obtaining these products online, and actions parents can take such as writing a letter of concern to their mayor or joining a local tobacco control coalition.
Interventions to Prevent Harms from Vaping

This comprehensive campaign, which appears in 7 languages (English, Spanish, Mandarin, Cantonese, Korean, Vietnamese and Tagalog), features television spots, radio, out-of-home advertising, and a dedicated website to distribute information about these products.

**E-Cigarettes and Teens: A Guide for Parents and Educators**

A resource guide (PDF) for parents, educators, and prevention professionals who work with teens and pre-teens. Topics covered include the e-cigarette delivery system, e-cigarettes and cannabis, and nicotine and the teen brain. Published in 2014, this resource guide is somewhat dated.

**What You Need to Know and How to Talk with Your Kids about Vaping**

A resource produced by Partnership for Drug-Free Kids in 2018, designed for parents to help them understand vaping, its appeal to youth, and known risks. The guide also includes information on cannabis and vaping, clues about whether a child is vaping, what parents can do to safeguard their children, and answers to common questions children might ask parents (e.g., They are just flavorings, so what is the big deal? Isn’t vaping safer than smoking cigarettes?).

**4. Health-Care Provider Intervention**

The grey literature search yielded one health-care provider intervention (Table 4). No evidence of effectiveness was available.

**Table 4: Health-Care Provider Interventions**

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Description</th>
<th>Jurisdiction</th>
<th>Population</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tobacco Free Futures Guidelines (PDF, 5As Approach)</strong></td>
<td>A model for practitioners to discuss tobacco (includes e-cigs) intervention with youth patients</td>
<td>Alberta, Canada</td>
<td>Ages 10-17</td>
<td>Alberta Quits</td>
</tr>
</tbody>
</table>

**5. Secondhand Aerosol-Free Policies**

Although secondhand vapour has been a term used by some jurisdictions, a more accurate term is secondhand aerosol. Some may view “vapour” as limited to the gaseous phase of water, which is inaccurate when describing secondhand aerosol from e-cigarette devices. In Ontario,
Interventions to Prevent Harms from Vaping

secondhand aerosol prohibitions have been added to prohibitions on smoking under the 2018 *Smoke-Free Ontario Act*. Vaping (or smoking) is prohibited in:

- Enclosed public places and workplaces
- School property (buildings and grounds)
- Indoor common areas of condominiums, apartment buildings, and university or college residences
- Child-care centres including home-child care
- Reserved seating areas of sports arenas or entertainment venues
- Motor vehicles while someone under the age of 16 is present
- Children’s playgrounds or public areas within 20 metres of a children’s playground
- Within 9 metres of any entrance or exit of a public or private hospital, psychiatric facility, long-term care home or independent health facility

Public health units maintain primary responsibility for education and enforcement.

6. Age Restrictions

Two broad types of interventions related to age restrictions:

- Minimum age for purchase (Table 5)
- Minimum age for access to outlets that sell

**Minimum Age**

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Description</th>
<th>Jurisdiction</th>
<th>Population</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raising minimum age (for purchase) - Age restrictions</td>
<td>Several American states have increased the age of purchase for vaping products</td>
<td>US - Must be 21 in the following states: California, Hawaii, Oregon, New Jersey, and Maine</td>
<td>Under 21</td>
<td>Various</td>
</tr>
</tbody>
</table>

**Minimum Age for Access**

In the US, the Food and Drug Administration is proposing that sales of flavoured e-cigarettes (excluding mint, menthol and tobacco flavours) at retail be prohibited in stores that youth can
legally access, unless for sale in an area with no access to underage youth.

7. Flavour Restrictions

The United States Food and Drug Administration is considering a ban on flavours that appeal to youth. In Canada, the Vaping and Tobacco Products Act prohibits the promotion of vaping products that use flavour category descriptors such as candy, dessert, and soft drink flavours.\textsuperscript{16}

8. Advertising and Promotion Restrictions

Federal law allows the advertising and promotion of vaping products but bans lifestyle advertising and advertising that appeals to youth. In Ontario, provincial legislation allows for the point-of-sale promotion, but not display, of product. Other provinces have banned point-of-sale promotion. We did not find evidence of the effects of restrictions on advertising and promotion of e-cigarettes. Restrictions would likely have similar effects to restrictions on tobacco advertising and promotion.

9. Labeling Requirements – Health Warnings/Health Claims

Both the United States and the European Union have stipulations requiring warnings about nicotine addiction and possible health effects. In Canada, the Federal Government is developing health warning regulations. We did not find evidence of effects of health warnings for e-cigarettes. Health warnings would likely have similar effects to those for tobacco.

10. Safety Requirements

Child-proof packaging for both devices containing e-liquid and e-liquid refill containers is a safety requirement in several jurisdictions. Under the European Commission’s Tobacco Products Directive:

- (40) Electronic cigarettes and refill containers could create a health risk when in the hands of children. Therefore, it is necessary to ensure that such products are child- and tamperproof, including by means of child-proof labelling, fastenings and opening mechanisms.
Interventions to Prevent Harms from Vaping

- In view of the fact that nicotine is a toxic substance and considering the potential health and safety risks, including to persons for whom the product is not intended, nicotine-containing liquid should only be placed on the market in electronic cigarettes or in refill containers that meet certain safety and quality requirements. It is important to ensure that electronic cigarettes do not break or leak during use and refill.

No interventions were found in the published or grey literature that access the utility or functioning of child-proof packaging relating to e-liquids.

**Interventions: Ontario**

Twenty of 35 public health units surveyed provided information on e-cigarette resources, programs, or policies that they have implemented within their health unit. Table 6 below provides a general overview. There were very few formal programs or interventions, with most activities being small-scale resources (posters, fact sheets, web pages, etc.). Most activities reported in Table 6 appeared to have been produced in-house at the health unit level. For a number of health units, some resources were being shared within a TCAN, and sometimes among health units from different TCANS. A small number of health units were using resource material developed by third parties, some of which are referred to in the tables presented earlier (e.g., Grey Bruce: Catch My Breath Youth E-cigarette Prevention Program; North West TCAN: Stanford Medicine’s The Tobacco Prevention Toolkit; North West TCAN: Scholastic’s E-Cigarettes: What You Need to Know (Teacher’s Guide).
## Table 6: Select Ontario Activities/Interventions

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<tr>
<th>TCAN PHU</th>
<th>School</th>
<th>Community</th>
<th>Public Education</th>
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## Interventions to Prevent Harms from Vaping

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## Interventions to Prevent Harms from Vaping

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Note: This table reports a mix of resources, programs and policies ranging from comprehensive to minor (e.g., a developed intervention to a single fact sheet), which makes it difficult to compare interventions by health unit (not the intended purpose of the table). Further, only select health units responded (n = 20, as indicated by Response = 1). Interpret table with care.
At Risk Populations

Based on the most recent national data available from the 2017 Canadian Tobacco, Alcohol and Drug Survey (CTADS),\(^\text{17}\) 15% of the Canadian population aged 15 years and over have ever-tries an e-cigarette, with 23% of youth aged 15 to 19 and 29% of young adults aged 20 to 24 having ever-tries. Among current or former smokers, 32% reported e-cigarette use as a cessation aid in the past two years.

In 2016/17, 10% of Canadian students in grades 7 to 12 used an e-cigarette in the past 30 days, a significant increase over that reported in 2014/14 at 6%.\(^\text{18}\) Males had a higher rate of past 30-day use of e-cigarettes than females (12% vs. 8%, respectively), and students in grades 10 to 12 had a higher rate than students in grades 7 to 9 (15% vs. 5%, respectively).\(^\text{18}\)

Among Ontario students in grades 7 to 12, 17.5% used e-cigarettes in the past year.\(^\text{19}\) Rates of past-year use differed by grade, with higher grades having higher rates for both vaping and cigarette smoking (Table 7). Initiation to vaping relative to cigarette smoking appears to start in earlier grades. For example, among students in grades 7 to 8, 3.9% vaped in the past-year but only 1.4% smoked cigarettes (interpret with caution, marginal estimate); among students in grade 9, 15.8% vaping but only 6.2% smoked cigarettes.\(^\text{19}\) These data suggest that vaping prevention interventions could begin earlier than more traditional tobacco prevention interventions.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Vape (Past Year)</th>
<th>Smoke (Past Year)</th>
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<tr>
<td></td>
<td>%</td>
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<tr>
<td>Grades 7-8</td>
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<td>Grade 7</td>
<td>S</td>
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<tr>
<td>Grade 8</td>
<td>5 M</td>
<td>3</td>
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<tr>
<td>Grade 9</td>
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<tr>
<td>Grade 12</td>
<td>28.3</td>
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M = Marginal estimate. Interpret with caution: subject to moderate sampling variability
S = Suppressed due to extreme sampling variability.
Source: Ontario Student Drug Use Survey 2017. Available from the Tobacco Informatics Monitoring System (TIMS)
Discussion

Most interventions observed in our review of the academic and grey literature were school-based and public education efforts that frequently appeared to be designed to teach youth about the dangers of vaping and to encourage them to refrain from initiating vaping or to stop vaping if they already used e-cigarettes. Only a moderate amount of information is available on the robustness of these kinds of interventions, with stronger information available when the intervention focuses more broadly on tobacco or smoking. School based and public education vaping interventions appear to strongly apply to public health. Table 8 provides a brief summary of the types of interventions we observed in the literature, an approximation of the existing knowledge of these types of interventions, and their relevance to TCANS and PHUs.

Table 8: Intervention Type by Existing Knowledge and Relevance to PHUs

<table>
<thead>
<tr>
<th>Intervention Type</th>
<th>Knowledge from Existing Examples</th>
<th>Relevance to TCAN / PHU Activity</th>
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<td>School-based Programming</td>
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<td>Community-based Programming</td>
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<td>Moderate/High</td>
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<td>Aerosol-free Policies</td>
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<td>High (enforcement)</td>
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<td>Age Restrictions</td>
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<td>High (enforcement)</td>
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<td>Safety Requirements</td>
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<td>Low</td>
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In general, several of the interventions in our review appeared to be tobacco interventions that were re-developed/applied to e-cigarettes. The extent to which evidence of effectiveness for similar interventions for tobacco cigarettes can be extrapolated to e-cigarettes is not known. If interventions have been successful at reducing rates of cigarette smoking, there is a potential that they will be successful at reducing rates of vaping. Differences between cigarette and e-cigarette interventions in contexts, evidence and environments need to be carefully examined before adoption.
To aid the reader’s understanding of what a vaping strategy might look like, we created a vaping path logic model (Figure 2), which includes infrastructure; interventions; paths (which lead to outcomes); and short, intermediate and long-term outcomes. Given the early state of e-cigarette intervention research and evaluation, the Infrastructure component is particularly relevant. For instance, leadership and coordination at the provincial, regional, and local level is needed to provide direction; build capacity; develop strategies and plans; and to assess, design, implement and evaluate promising and developed interventions.

Vaping has made significant inroads in Ontario since it emerged onto the scene about a decade ago. Compared to tobacco, vaping rates are higher among students in earlier grades, which suggests prevention interventions for vaping should start earlier than those for cigarettes. Current vaping rates are particularly high among older teens and young adults, which suggest that vaping might be influenced by their socio-ecologic position in society. Effective future inventions will need to address the complex interplay of factors that can encourage vaping, such as the school/university environment, peer pressure, family factors, social media, and product marketing. To accomplish this, a coordinated and planned strategy will be vital to this work.
Figure 2: Vaping Path Logic Model, Ontario

**Infrastructure**
- Leadership, coord & collab: MOHLTC, TCANs, PHUs, NGOs, HC
- Capacity building: Health practitioners, school authorities
- Technical assistance: TCANs, PHUs, NGOs
- Research, evaluation, surveillance: Local, prov.
- Knowledge exchange

**Interventions**
- Public Education: Mass media, social marketing, social media, online tools, earned media
- School: Teacher, parent, student resources; curriculum/extra curricula prevention & cessation programming; enforcement strategy
- Community: Resources, cessation programming
- Health care provider: 3A/5A, training, etc.
- Policy (education, implementation, enforcement): School, university, community, retail

**Paths**
- Knowledge / awareness
- Physical & social exposure
- Access / availability
- Resiliency
- Social climate

**Short-Term**
- Increased knowledge of potential health affects
- Increased awareness of addiction / dependence
- Increased positive attitudes toward vape-free lifestyle, aerosol-free space, restrictions on flavours, etc.
- Decreased youth access to vaping products
- Increased enforcement to limit youth access & social exposure

**Intermediate**
- Reduced susceptibility to experimentation with vaping products
- Increased age of onset
- Increased availability of vaping products including visibility at point-of-sale and number of retail outlets
- Increased tobacco cessation among dual users
- Increased policy action

**Long-Term**
- Reduced initiation
- Increased lifetime abstinence
- Decreased prevalence: tobacco & vape
- Reduced exposure
Appendix A – CATCH My Breath: Sample of a Take-Home Activity

**CATCH® MY BREATH**

**Handout 2, Session 2**

**Adult Interview**

Ever wonder what it was like to be a young person in your parent’s day and age—back in the “old days” before smart phones and the Internet? Do you think your parents had to make tough decisions about whether to use tobacco? Now is your chance to find out. Your assignment is to ask a parent (or another adult you know) the questions listed below. Write the answers on this sheet. You will share the information with your class in the next CATCH My Breath session.

*Name of person you are interviewing and their relationship to you.*

______________________________________________________________________

1. Have you ever tried tobacco - even a puff? (Yes or No)
   (If NO, skip ahead to question 5.)
2. How old were you when you first tried tobacco? _________
3. What influenced you to try tobacco?
   __________________________________________________________________
   __________________________________________________________________
   ______________________________________________________

4. Did you become a regular user of tobacco? (Yes or No)
   a. Have you ever tried to quit using tobacco? (Yes or No)
   b. Did you feel you were addicted to the nicotine in tobacco? What did it feel like to stop using tobacco once you were addicted?
   __________________________________________________________________
   __________________________________________________________________
   ______________________________________________________

5. Have you heard of E-cigarettes? If so, what have you heard?
   __________________________________________________________________
   __________________________________________________________________
   ______________________________________________________
6. What pressures do you think people my age might feel to make them experiment with E-cigarettes? Peer pressure? Pressure from advertising? Pressure from role models?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

7. What advice would you give someone my age who is thinking about trying an E-cigarette or tobacco?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
Appendix B – Get Smart About Tobacco: Sample Worksheet

Worksheet 3

MAKING SMART DECISIONS

What would you do or say if you were faced with a potentially risky situation involving tobacco? It can be helpful to make a plan beforehand so that you are better prepared to react on the spot.

Read the scenarios below. What could you say if you were in the situation to help you and the people around you stay safe from tobacco? On a separate piece of paper, write a paragraph explaining how you would respond to each scenario. Using facts can help strengthen your argument when you are saying no to something. Be sure to support your answer with facts about the dangers of tobacco and related products.

Scenario 1:
Ashley is going to her friend Natalie’s house. Natalie’s sister Lauren is home from college and has some friends over. When Ashley arrives at Natalie’s, she notices that Lauren and her friends have been smoking in the house.

Natalie: Come in! I just made popcorn and started a movie.

Ashley: Um...

Natalie: What’s the matter? Don’t worry, Lauren and her friends are leaving. I opened the windows to get rid of the smoke smell.

Should Ashley stay at her friend’s house, where people have been smoking?
Write a paragraph explaining the risks. What would you do or say if you were in this situation?

Scenario 2:
Sam is in a convenience store with his older brother, Jackson, and his brother’s high school friend Luke. They are looking at a display of e-cigarettes.

Jackson: Hey, have you ever tried e-cigarettes?

Luke: No, but I’m not going to get hooked on them, so they’re not a big deal.

Sam: But Jackson, isn’t smoking bad for you?

Jackson: E-cigarettes aren’t dangerous like real ones, Sam. You don’t breathe in tobacco smoke, so they must be safe.

What do you think about the older boys’ claims about e-cigarettes? What should Sam say?
Write a paragraph explaining why teens should avoid e-cigarettes. What dangers do they pose?
Appendix C – Physician Advocacy Network’s Vaping and JUULing Lesson Plan

Lesson Plan: Vaping and JUULing

Subject: Health and Well-being
Total Time: 1 hour

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<td>1. Describe vapes and JUULs</td>
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<td>2. Identify key ingredients in vapes and JUULs and how they affect the human body</td>
</tr>
<tr>
<td>3. Identify specific health and medical risks associated with vaping and JUULing</td>
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<tbody>
<tr>
<td>• Post-it notes</td>
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<tr>
<td>• “What’s in e-liquid?” cards</td>
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<td>• White board</td>
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<td>• Projector and laptop</td>
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<th>Overview of Lesson</th>
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<tbody>
<tr>
<td>• Warm-up activity: Post-its and True/False (10 mins)</td>
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<tr>
<td>• Presentation on vaping and JUULing (5 mins)</td>
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<tr>
<td>• “What’s in e-liquid?” activity (10 mins)</td>
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<tr>
<td>• Finish presentation on vaping and JUULing (5 mins)</td>
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<td>• Questions (5 mins)</td>
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<td>• Closing activity: Post-its (2 min)</td>
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<tbody>
<tr>
<td>Post-its:</td>
<td></td>
</tr>
<tr>
<td>Before class starts, write the following on the board: “On a scale of 1-10, how harmful is vaping or JUULing, where one is not at all harmful and 10 is very harmful?”. Give each student a post-it note and ask them to put their name on the post-it and place it under a number. Ask for one volunteer from the most common response to briefly explain their rationale. Tell students that you will revisit this chart at the end of class.</td>
<td></td>
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<tr>
<td>True/False:</td>
<td></td>
</tr>
<tr>
<td>Explain to the students that they’re going to play a True/False game. You are going to read a statement and if they think it’s true, they should go to the right-hand side of the room. If they think the statement is false they should go to the left-hand side of the room. Display the first slide and cue the statements one at a time while you read them to the class. After students determine their answers. Explain the correct answer (in the slide notes).</td>
<td></td>
</tr>
</tbody>
</table>
### Interventions to Prevent Harms from Vaping

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intro to E-cigarettes</strong></td>
<td>10 mins</td>
</tr>
<tr>
<td>Share slides 1-12 with the students.</td>
<td></td>
</tr>
<tr>
<td><strong>Smoking vs Vaping Video</strong></td>
<td>10 mins</td>
</tr>
<tr>
<td>While students watch, have them consider: Imagine a classmate wants you to try vaping and tell them why you choose not to. Once you finish the video, students discuss responses with their partner and ask for one or two answers to share with the whole class.</td>
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<tr>
<td><strong>“What’s in e-liquid?” Activity</strong></td>
<td>15 mins</td>
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<tr>
<td>Distribute one side of a chemical cards to students. Students then must find the person who matches the image of a product that contains that chemical to the chemical description. Stand in a circle and each pair tells the class their chemical and what it does to your body. Ask whole class, why do you think they put so many chemicals into e-cigarettes?</td>
<td></td>
</tr>
<tr>
<td><strong>Finish Presentation on Vaping/JUULing</strong></td>
<td>5 mins</td>
</tr>
<tr>
<td>Share slides 13-21 with the students.</td>
<td></td>
</tr>
<tr>
<td><strong>Questions</strong></td>
<td>5 mins</td>
</tr>
<tr>
<td>Answer any questions the students may have and feel free to follow up with the Physician Advocacy Network if you aren’t sure the answer!</td>
<td></td>
</tr>
<tr>
<td><strong>Closing Activity</strong></td>
<td>5 mins</td>
</tr>
<tr>
<td>Give students the opportunity to move their post-it if they have changed their opinion since the beginning of class. Ask students what they learned during class that was surprising or new about e-cigarettes.</td>
<td></td>
</tr>
</tbody>
</table>
Appendix D – smokeSCREEN Videogame Content Sample

During class, John walks into the bathroom and sees someone they kind of know vaping. Logan asks if you wanna try it...

Make your choice!

“Thanks, but I’m good.”

“Yeah let me try.”
Appendix E – The “Real Cost” Campaign Sample Poster

34% OF YOU SAID YOU CAN INHALE NICKEL WHEN VAPING.

66% SAID YOU CAN INHALE LEAD WHEN VAPING.

WELL GUESS WHAT?

IT’S BOTH.

NOT TO MENTION CHROMIUM, ALUMINUM, AND TIN.

therealcost When we asked you about vaping metals, it was a trick question you couldn’t get wrong. #TheRealCost #Vape #Vaping #ECig #ECigs

Load more comments

mikewattsfbgm @juicy_j_315

therealcost @jasprosesprite we hear you! Check this: Did you know that most vapes contain nicotine, the same addictive chemical found in cigarettes? Add that to the fact that vaping can

13,480 views

JANUARY 2
Interventions to Prevent Harms from Vaping

References


7. Dr. B. Halpern-Felsher, personal communication, January 14, 2019

8. A. Krapek, personal communication, January 22, 2019


15. J. Liewer, personal communication, January 22, 2019


