

PROJECT NEWS

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Responding to a Growing Need for E-Cigarette Research in Ontario



Welcome to the second in our series of four newsletters from OTRU's Research on E-Cigarettes (RECIG) Project! We are happy to be sharing information about our activities and progress. Our first newsletter discussed the growing popularity of e-cigarette use in Ontario and the urgency of research to inform current

e-cigarette knowledge gaps, and guide future provincial policy and legislation. This newsletter highlights initial findings from our knowledge synthesis, a study of the effects of e-cigarettes on cue-induced craving, analysis of national survey data and a report of findings from a longitudinal panel of smokers.

The following components of the RECIG study are well under way:

- Comprehensive knowledge synthesis of e-cigarette literature
- Analysis of data from existing e-cigarette surveys
- Longitudinal survey to measure patterns of e-cigarette use among adults (19 years and over)
- Surveys and in-depth interviews to understand prevalence, attitudes and knowledge of e-cigarette use among youth and young adults (15 to 29 years of age)
- Social media analysis of e-cigarette message exposure, reach and content

- Randomized clinical trial comparing smoking cessation effectiveness of e-cigarettes and nicotine replacement therapy products
- Biomarker study of e-cigarette users to measure concentrations of nicotine and other chemicals
- International, multidisciplinary Expert Panel to assess project findings and identify implications for public health policy

Additional background information on the RECIG project can be found online in the OTRU Update: *Research on the Use and Impact of Electronic Cigarettes* (<http://otru.org/otru-research-use-impact-electronic-cigarettes/>) and the first Project News publication: *Introduction to RECIG: Research on E-Cigarettes* (<http://otru.org/introduction-recig-research-e-cigarettes/>).

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Effectiveness of E-Cigarettes as a Smoking Cessation Aid

Preliminary Knowledge Synthesis Finds Evidence for the Effectiveness of E-Cigarettes as a Smoking Cessation Aid is Weak

Great progress has been made since we provided an update in the first RECIG newsletter on our knowledge synthesis examining the prevalence of e-cigarette use, health effects of e-cigarette use, the effectiveness of e-cigarettes as a cessation aid, and the relationship between the use of e-cigarettes and uptake of cigarette smoking. Here we present preliminary results of our analysis of peer-reviewed and grey literature investigating the effectiveness of e-cigarettes as a smoking cessation aid.

We identified and assessed 49 articles that investigate primary and/or secondary outcomes related to the effectiveness of e-cigarettes as a smoking cessation aid.

Primary outcomes measured:

- Smoking abstinence
- Smoking reduction

Secondary outcomes measured:

- Withdrawal symptoms
- Cravings
- Nicotine delivery

The internationally-recognized Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach was used to assess the overall quality of evidence per outcome measure.¹ Of the included studies, 23 were graded as weak, 23 were ranked as moderate, and only three had a strong quality assessment.

The state of the evidence about the effectiveness of e-cigarettes as a smoking cessation aid is currently assessed as very low to low, due primarily to methodological weaknesses of current studies. Evidence of a positive association between e-cigarette use and smoking reduction is slightly better but also

weak as indicated by a GRADE assessment of low to moderate.

Effect on Cue-Induced Craving

Electronic Cigarettes Demonstrate Some Effect on Cue-Induced Craving in Daily Dependent Smokers

Craving is a crucial component of continued smoking and relapse.² Cue-induced craving involves urges to smoke in response to environmental cues while withdrawal-induced craving involves drug-seeking to avoid negative effects when substances are withheld.^{3,4} E-cigarettes can mimic conventional cigarettes in taste and taction. Studies to date report equivocal findings with respect to the effectiveness of e-cigarettes to decrease craving and suppress withdrawal symptoms, as well as their utility as a cessation aid.⁵⁻⁷ The RECIG team is conducting a randomized control trial to evaluate the efficacy of e-cigarettes in reducing cue- and withdrawal-induced craving in daily dependent smokers.

We plan to have 40 participants complete the study. Currently, we have collected data for 32 daily smokers (≥ 10 cigarettes/day; CPD) ages 18 to 65 with a Fagerström Test of Nicotine Dependence⁸ (FTND) score of 3 or higher, who have never smoked an e-cigarette prior to the study and do not wish to reduce or quit smoking.

Participants are randomized to one of four groups, each receiving all the experimental conditions in a different order. Conditions are: 1. tobacco cigarette, 2. e-cigarette with placebo lozenge, 3. e-cigarette with nicotine lozenge, and 4. lozenge alone. Participants are asked to abstain from smoking for 12 hours prior to study visits. Expired carbon monoxide (CO), measured by a Bedfont piCO+ Smokerlyzer[®] is used to confirm smoking abstinence ($\text{CO} \leq 10\text{ppm}$) at the beginning of each visit.

The participants to date are 35 years old on average; 56% are female. They are moderately to heavily dependent on cigarettes, smoking on average 18 cigarettes per day with a score of 6 on the Fagerström Test of Nicotine Dependence.

Our preliminary results indicate that only the e-cigarette plus nicotine lozenge condition was able to suppress cue-induced cigarette craving for up to

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3 hours. All other conditions were able to suppress cue-induced cigarette craving for 1 hour after use but not after 3 hours. These findings suggest that non-nicotine e-cigarettes can suppress craving similar to traditional cigarettes. The addition of a nicotine lozenge prolongs the craving reduction for up to 3 hours.

Prevalence of E-Cigarette Ever Use

National Survey Finds High Prevalence of E-Cigarette Ever Use, Especially among Current Smokers

The Canadian Tobacco, Alcohol and Drugs Survey (CTADS) is a general population survey of tobacco, alcohol and illicit drug use among Canadians aged 15 years and older, that is conducted every other year.⁹

According to 2013 CTADS data, 16% of Ontarians aged 15 to 24 years (15% of youth 15 to 19 years; 18% of young adults 20 to 24 years) have ever tried an e-cigarette. Rates of use are higher among young people who smoke; 73% of current smokers (smoked in the past 30 days) between 15 to 24 years have ever tried vaping. Individuals in this age group who have never smoked tobacco cigarettes also demonstrated interest in e-cigarettes; 8% of never smokers reported having vaped at least once in their lifetime, representing close to 128,800 Ontarian youth and young adults.

In Ontario, more than half (57%) of current or former smokers aged 15 years and over who had ever tried an e-cigarette reported using it as a smoking cessation aid in the past two years. The CTADS survey did not measure the effectiveness of e-cigarettes as a cessation aid.

Nicotine-containing e-cigarettes were last used by 26% of ever users of e-cigarettes (representing approximately 165,300 individuals). The majority (53%) of ever users reported that the last e-cigarette they used did not contain nicotine, while 21% were unsure.

At a national level, ever use of an e-cigarette among individuals 15 years and over (9%) is significantly higher than rates in Ontario alone (6%). Close to 2% of the

Canadian population in this age group, representing approximately 521,000 individuals, reported having vaped in the last 30 days, indicative of current e-cigarette use.

These CTADS findings are among the first to provide a national snapshot of e-cigarette use in Canada and demonstrate the need for longitudinal research to identify vaping trends.

Monitoring Trends of E-Cigarette Use via a Longitudinal Panel

Few surveys have measured the patterns of e-cigarette use over time, largely because they are cross-sectional in nature and take place over a short time frame. As a result, these studies are limited in the guidance they can offer policy-makers on the effectiveness of e-cigarettes as smoking cessation tools or their ability to act as a gateway to tobacco and other substance use. In January, we launched a 6-month Adult Smoker Longitudinal Panel to measure patterns of e-cigarette use among adult smokers in Ontario.

Survey participants were recruited from three partner studies: OTRU's Smokers Panel, CAMH's Smoking Treatment for Ontario Patients (STOP) project, and the CAMH Monitor. These participants previously consented to be contacted for future research. Participants were invited by telephone or email to complete a web-based baseline survey and a six month follow-up survey.

To be eligible for the Adult Longitudinal Panel, participants were required to meet the following eligibility criteria:

- 18 years or older
- Resident of Ontario
- Ever-user of tobacco cigarettes (ever-users are defined as having taken at least one cigarette puff in their lifetime)

A total of 1,962 participants were included in the preliminary analysis. Highlights from the Adult



Longitudinal Panel baseline survey:

- 64% (n = 1254) of participants have ever used an e-cigarette
- 35% (n=436) of ever users have used an e-cigarette in the last 30 days
- 80% of ever users reported first using e-cigarettes as a way to reduce or quit their tobacco use (n=998); among these participants (n=998), 18% (n=183) reported having successfully quit smoking tobacco cigarettes with the help of e-cigarettes, and 78% (n=781) reported being somewhat or very successful at cutting down their tobacco use while using e-cigarettes
- 54% (n = 673) of e-cigarette ever users said the last e-cigarette they used contained nicotine; 29% (n=368) said their last e-cigarette did not contain nicotine and 17% (n=213) did not know

Invitation to Propose Additional Research Questions

This grant provides the opportunity for Applied Health Research Questions (AHRQ). An AHRQ is a question posed by a health system policy maker or provider (Knowledge User) in the interest of obtaining research evidence to inform planning, policy, and/or program development that will benefit the broader Ontario health system. Knowledge Users are invited to submit a Knowledge Request to Research Providers with the goal of identifying research gaps and opportunities for knowledge generation.

For more information about initiating an AHRQ request, contact: Robert.Schwartz@utoronto.ca
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The Ontario Tobacco Research Unit (OTRU) is an Ontario-based research network that is recognized as a Canadian leader in tobacco control research, monitoring and evaluation, teaching and training and as a respected source of science based information on tobacco control.

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