

# Smoking Cessation Among Young Adult E-cigarette Users in Canada: Secondary Analysis of Data from a RCT

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  - Propel Centre team

## Protocol

# Effect of a Mobile Phone Intervention on Quitting Smoking in a Young Adult Population of Smokers: Randomized Controlled Trial Study Protocol

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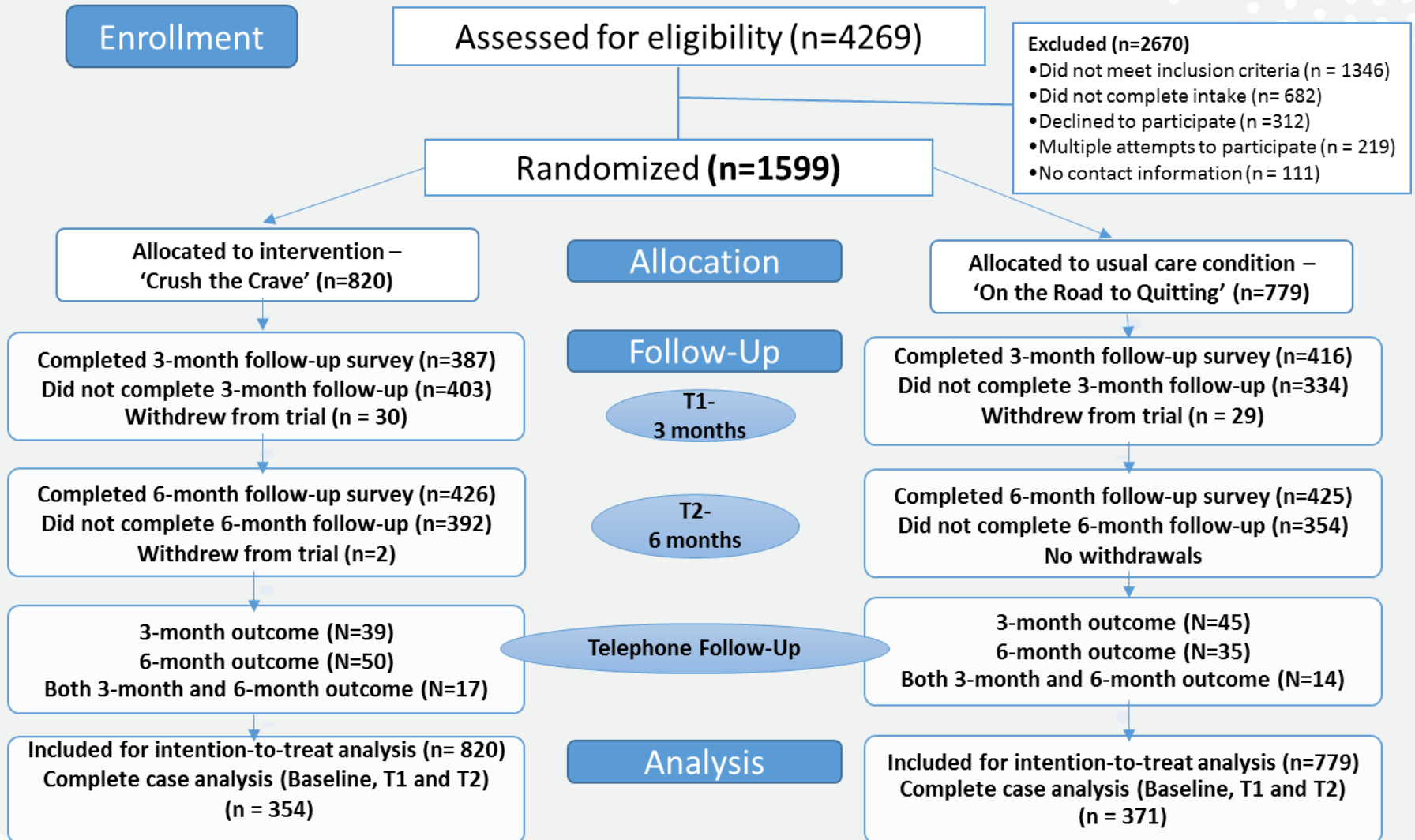
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# Methods

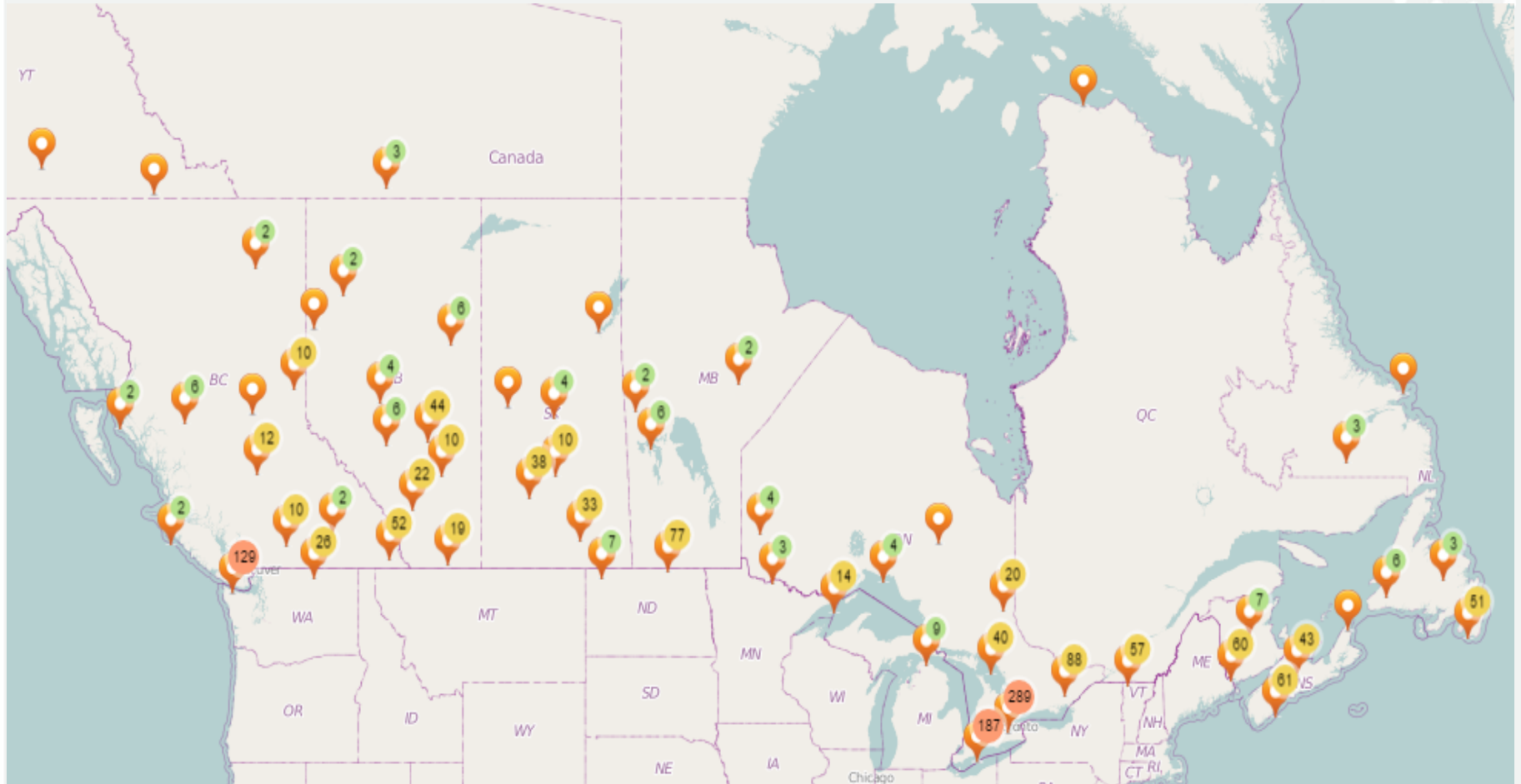
## Study Population

- Canadians 19 to 29 years of age
- Daily smokers
- Considering quitting in the next 30 days
- Own an Android or iPhone OS device
- Not referred by a study participant
- English comprehension
- Able to provide informed consent

# CONSORT-EHEALTH Diagram



# Canada-Wide Participation



Original Paper

## Effect of a mobile phone intervention on quitting smoking in a young adult population of smokers: results from a randomized controlled trial

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# Participant Characteristics at Baseline

Baseline Variable	All participants			Participants lost to follow-up			Remaining participants		
	CTC	OnRQ	p-Value	CTC	OnRQ	p-Value	CTC	OnRQ	p-Value
	(n=820) n (%)	(n=779) n (%)		(n=394) n (%)	(n=354) n (%)		(n=426) n (%)	(n=425) n (%)	
<b>Demographics</b>									
Female	364 (44.9)	365 (47.0)	0.39	172 (44.3)	160 (45.2)	0.81	192 (45.4)	205 (48.6)	0.35
Age 19 to 23	409 (49.9)	376 (48.3)	0.52	206 (52.3)	182 (51.4)	0.81	203 (47.7)	194 (45.7)	0.56
Single – never legally married	508 (62.6)	486 (62.8)	0.92	242 (62.2)	213 (61.0)	0.74	266 (62.9)	273 (64.2)	0.68
High school or less education	351 (43.0)	361 (46.6)	0.15	183 (46.7)	181 (51.6)	0.18	168 (39.6)	180 (42.6)	0.39
Caucasian	599 (75.4)	569 (74.8)	0.79	285 (74.6)	265 (76.6)	0.53	314 (76.0)	304 (73.3)	0.36
Paid work	539 (67.5)	527 (69.6)	0.38	259 (67.5)	242 (70.4)	0.50	280 (67.6)	285 (69.0)	0.67
Income < \$45,000	484 (65.6)	457 (64.6)	0.71	249 (69.4)	213 (67.0)	0.51	235 (62.0)	244 (62.7)	0.84
<b>Smoking and quitting behavior</b>									
Moderate to high nicotine dependence	219 (27.1)	205 (26.5)	0.79	111 (28.7)	97 (27.6)	0.73	108 (25.7)	108 (25.7)	1.00
Smokes at least a pack per day or more	210 (25.7)	200 (25.7)	0.99	109 (27.8)	97 (27.4)	0.90	101 (23.8)	103 (24.4)	0.86
Very/Extremely confident to quit	330 (40.8)	302 (39.2)	0.52	162 (41.7)	133 (37.9)	0.30	168 (40.0)	169 (40.3)	0.92
High stress level	240 (30.5)	237 (31.7)	0.60	123 (32.4)	104 (30.6)	0.61	117 (28.7)	133 (32.6)	0.22
Used NRT currently or in the past	424 (51.7)	419 (53.8)	0.41	196 (49.8)	169 (47.7)	0.58	228 (53.5)	250 (58.8)	0.12
Used E-cigarettes currently or in the past	500 (61.0)	472 (60.6)	0.87	242 (61.4)	210 (59.3)	0.56	258 (60.6)	262 (61.7)	0.75
<b>Friends/ partner smoking and level of support</b>									
Two or more close friends smoke	682(85.1)	639 (84.2)	0.60	331 (86.0)	287 (83.7)	0.39	351 (84.4)	352 (84.6)	0.92
Living with partner who smokes	228(28.0)	229 (29.4)	0.52	106 (27.2)	107 (30.2)	0.36	122 (28.7)	122 (28.8)	0.98
High social support level	235 (31.1)	243 (33.2)	0.38	110 (30.7)	110 (33.1)	0.50	125 (31.5)	133 (33.3)	0.58

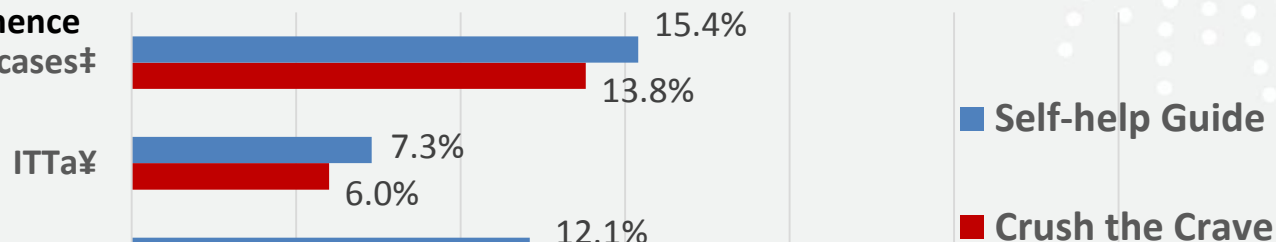


# Primary and Secondary Outcomes

## Primary Outcome

### Continuous Self-Reported Abstinence

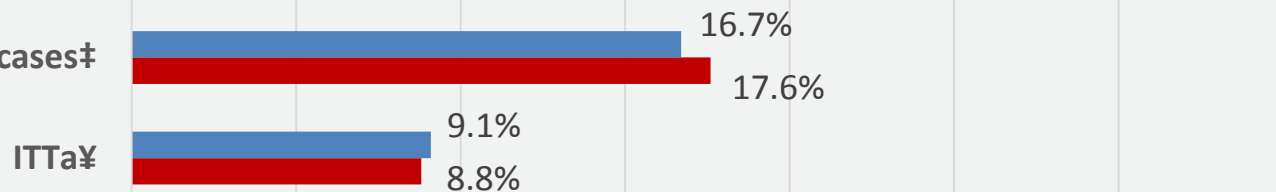
Complete cases‡



## Secondary Outcomes

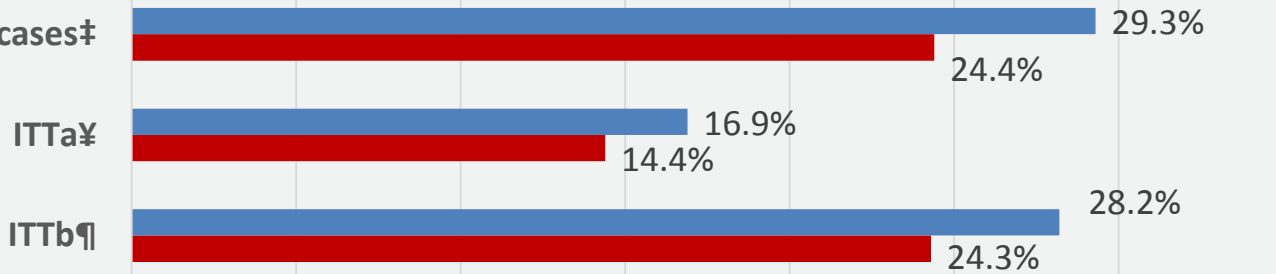
### 30-day PPA at 3-mos. follow up

Complete cases‡



### 30-day PPA at 6-mos. follow up

Complete cases‡



0.0% 5.0% 10.0% 15.0% 20.0% 25.0% 30.0% 35.0%

‡: Complete case analysis (n=725)

¥: Intent-to treat analysis. Last observation carried forward (n=1599).

¶: Intention-to-treat analysis. Multiple imputation of outcomes (n=1599).

# E-cigarettes & Smoking Cessation among Young Adults in Canada

## Objectives

- To examine the cessation rates at six months for young adult smokers using e-cigarettes compared to smokers not using e-cigarettes in Canada.
  - This study is a longitudinal cohort of young adult smokers recruited into a randomized controlled trial for quitting smoking.

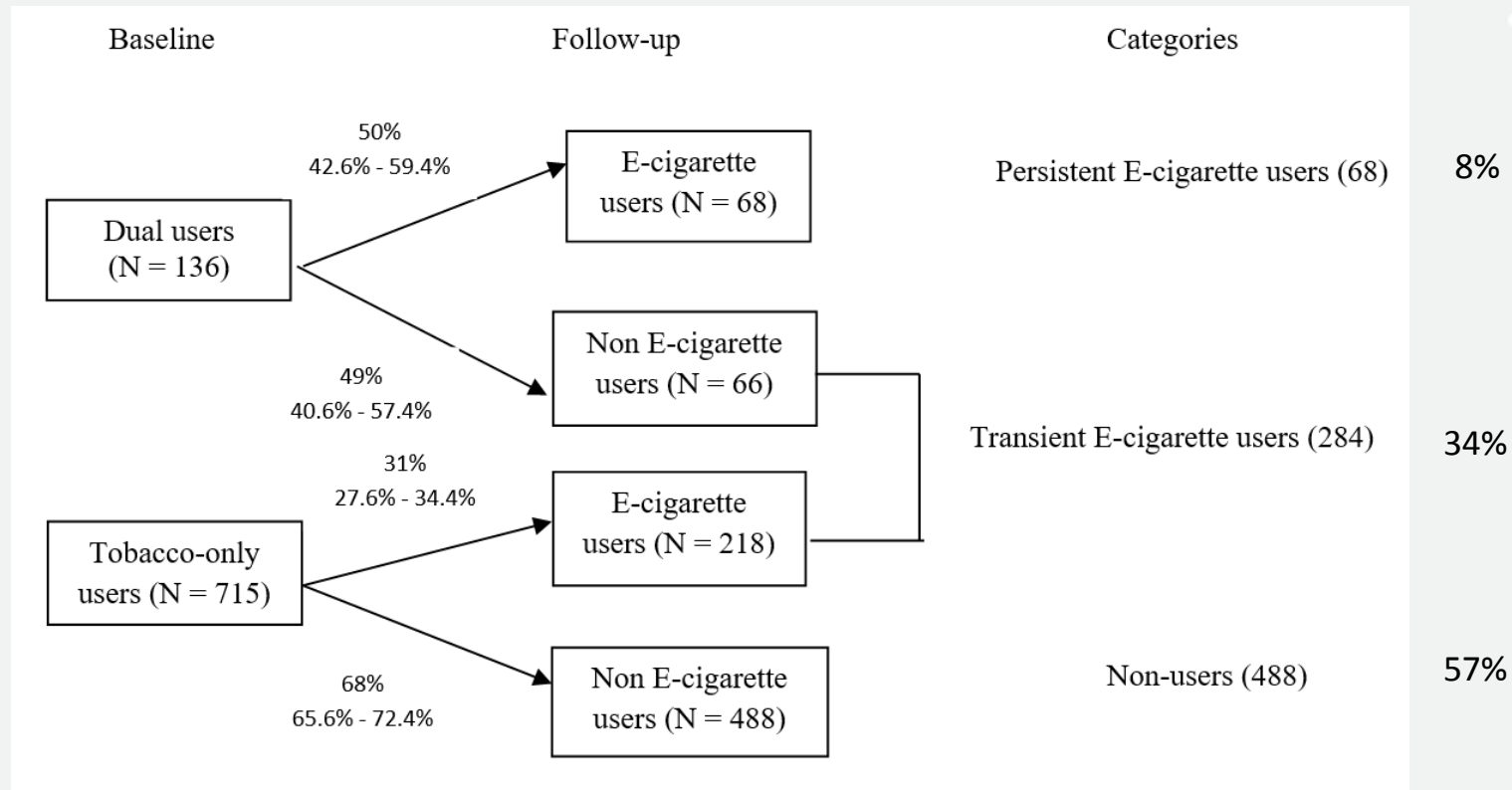
# E-cigarettes & Smoking Cessation Among Young Adults in Canada

## Methods

- Secondary analysis of data from a RCT
- Sample of motivated to quit young adult smokers (n=851) recruited in 2014 and measured at baseline and at 6 months
- Measured 30-day and 7-day point prevalence abstinence, e-cigarette current use, demographics, self-efficacy, nicotine addiction, and use of quit supports/cessation aids.
- Multi-variable logistic regression to examine the association between young adult smokers using e-cigarettes and cessation rates at six months controlling for demographics, self-efficacy, level of addiction, intervention engagement and use of quit supports.

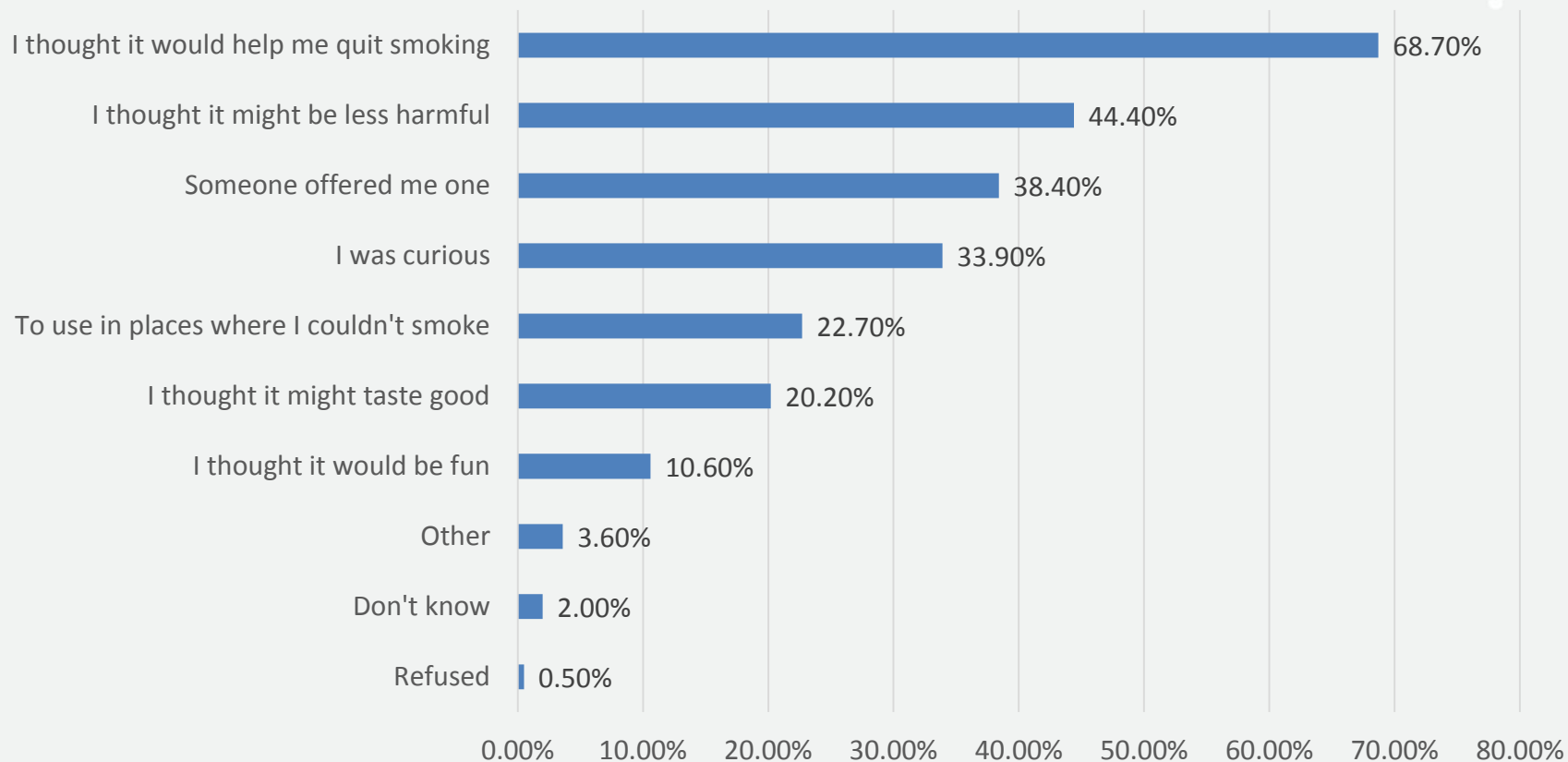
# E-cigarettes & Smoking Cessation Among Young Adults in Canada

Proportion of Dual, E-cigarette and Non EC users



# Results: Reasons for E-cigarette Use at Baseline

Reason for First Trying E-cigarettes (n=635)\*

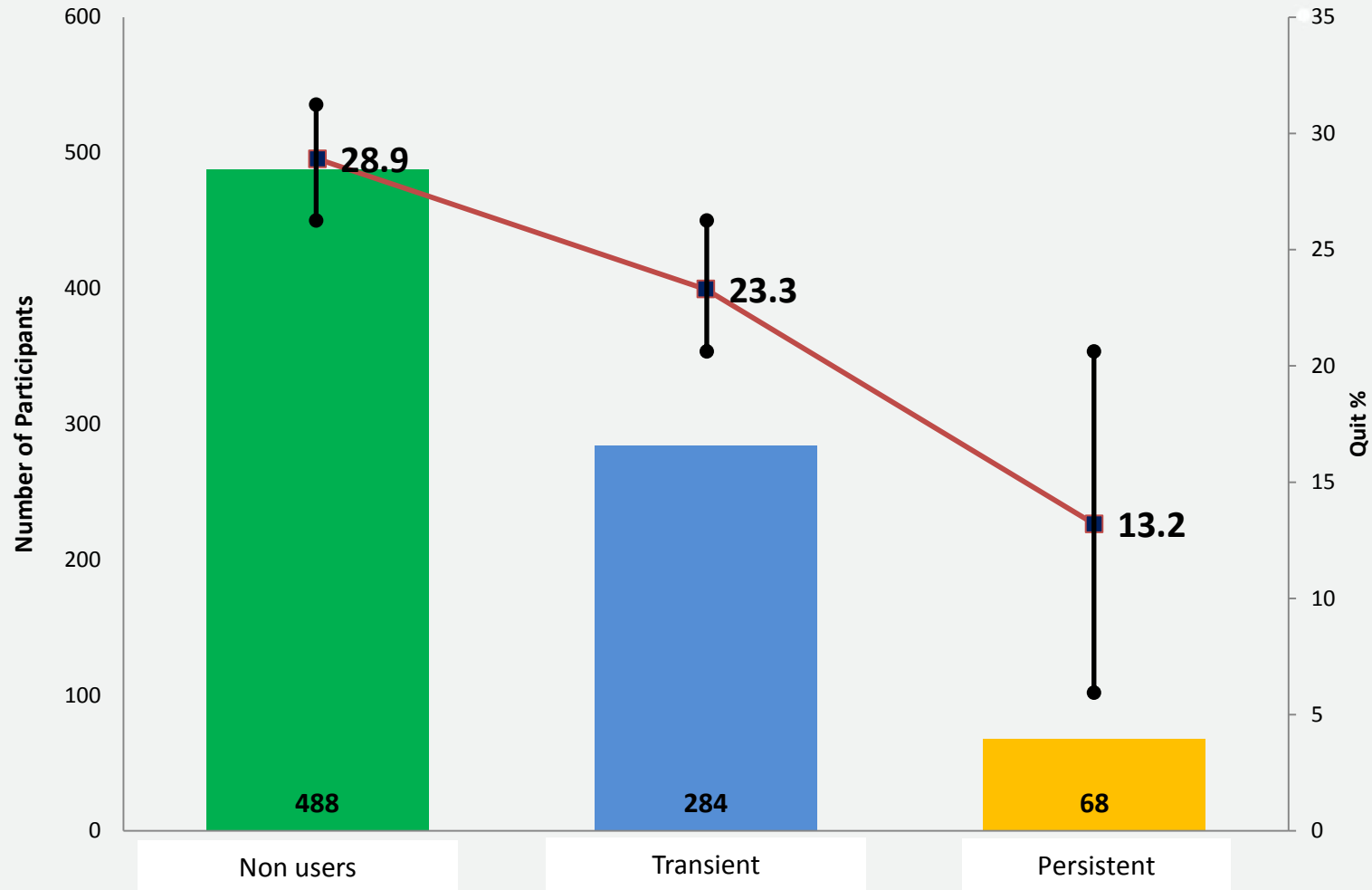


\*Percentages add to more than 100% due to multiple responses.

# Characteristics of E-cig and Non-ecig Users at Baseline

- Persistent and transient e-cig users significantly more likely than non-users to be:
  - Younger
  - Living outside of Ontario
  - Having a higher level of addiction
  - Using other quit aids (e.g., NRT and health professional advice)
- These variables, other demographics and self-efficacy were controlled for in logistic regression analyses

# Results: 30-day Point Prevalence Abstinence & E- Cigarette Use



$\chi^2=8.73, p\text{-value}=0.013$



# Results: Association between e-cigarette user category and 30 day cessation rate

EC user Type	30-day Cessation rate <sup>a</sup> n (%)	COR crude <sup>b</sup> (95% CI)	AOR adjusted <sup>c</sup> (95% CI)
<b>EC user category</b>			
Persistent users (ref group)	9 (13.2)	1.00	1.00
Transient users	66 (23.3)	1.95 (0.92--4.20)	2.40 (1.01-5.58)
Non-users	141 (28.9)	2.62 (1.26-5.43)	3.23 (1.41--7.40)
<b>Ever Nicotine EC use</b>			
Nicotine EC user (ref group)	89 (18.9)	1.00	1.00
Ever without nicotine user	38 (29.7)	1.85 (1.18--2.88)	2.01 (1.24--3.30)
Never user	83 (37.1)	2.54 (1.78--3.63)	2.92 (1.98--4.30)
<b>Frequency of EC use</b>			
Last 30-days (ref group)	16 (13.2)	1.00	1.00
Once a week EC users	17 (25.3)	2.19 (1.02--4.69)	1.77 (0.77--4.06)
Daily EC users	24 (24.5)	2.18 (1.08--4.39)	2.16 (1.03--4.53)
Non-users	159 (28.7)	2.64 (1.50--4.61)	2.56 (1.43--4.59)

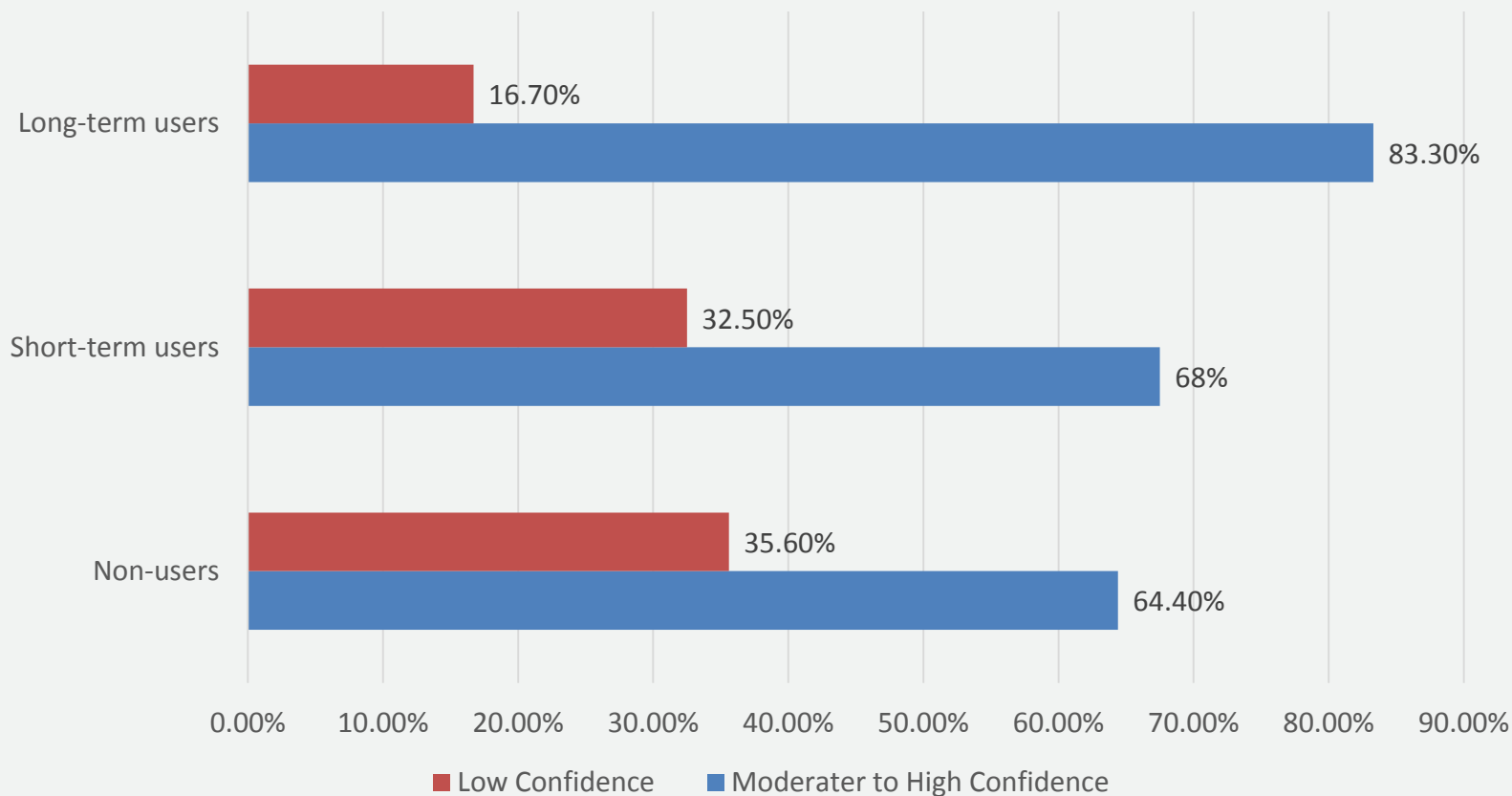
Notes: CI = Confidence Interval; <sup>a</sup>Number and percent of participants who obtained 30-day abstinence at 6-months follow-up survey in each group.

<sup>b</sup>Bivariable analysis: series of models that assessed the association of EC use (persistent, transient and non-users) individually with 30-day smoking abstinence.

<sup>c</sup>Covariates included in adjusted model: ethnicity, baseline variables (quit aid current use, self-efficacy, social norms, level of addiction) and 6-month follow-up variables (quit attempt, intervention use).

# Results: Confidence in Quitting

Confidence in quitting among e-cigarette users and non-users who had not quit smoking at 6 months (n=456).



# E-cigarettes & Smoking Cessation Among Young Adults in Canada

## Discussion

- 8% long-term dual users and 34% classified as short-term users over a six-month period.
- 69% of e-cigarette users indicate the reason for using e-cigarettes is for 'help in quitting'.
- Young adult smokers not using e-cigarettes at baseline and at follow-up were 3.23 times more likely to quit smoking as compared to long-term users. Short-term users were 2.34 times more likely to quit smoking.
- **Conclusion – Dual users who continued to vape with e-cigarettes for longer duration were less likely to quit tobacco than non users, despite reported high levels of confidence to quit.**

# Discussion

## Limitations

- a) this study makes no claim of cause and effect – it is observational;
- b) possible misclassification bias for nicotine containing e-cigs;
- c) possible response bias in terms of self-reported smoking status, social-desirability, etc.;
- d) No biochemical validation; and
- e) Secondary analysis of data from a parent study.

# E-cigarettes & Smoking Cessation Among Young Adults in Canada

## Conclusion

- Findings from this study are similar to the findings of the systematic review by Kalkhoran & Glantz<sup>1</sup>
  - Odds of quitting cigarettes were 28% lower in those who used e-cigarettes compared with those who did not (OR = 0.72, 95% CI, 0.57 – 0.91).
- RCTs done to-date offer very limited evidence regarding the impact of e-cigarettes on tobacco cessation<sup>2</sup>
- Real-world evidence from observational studies would seem to suggest that e-cigarette use is associated with reduced tobacco cessation.
- Despite claims by the industry, not a panacea for helping smokers quit tobacco.
- More research is needed to evaluate the impact of vaping on population-level tobacco use and the health effects of long term vaping.

1. Kalkhoran, S. & Glantz, S.A. (2016). E-cigarettes and smoking cessation in real-world and clinical settings: a systematic review and meta-analysis. *Lancet Respir Med.* 4: 116-28.

2. Malas, M. et al. (2016). Electronic cigarettes for smoking cessation: A systematic review. *Nicotine & Tobacco Research*, 18(10): 1926-1936.

# Questions

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# Results: 30-day Point Prevalence Abstinence – NRT & Pharmacotherapy Use

