Effect of e-cigarette use on success of smoking cessation attempts in Australia in 2019

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Introduction

Smoking is a factor in 13 percent of Australian deaths [1]. Initiatives that reduce smoking rates will positively impact life expectancy. There is evidence that the use of e-cigarettes (vaping) as an aid during attempts to quit tobacco cigarettes increases the success rate of quit attempts [2]. However, the sale of nicotine e-cigarettes is banned in Australia and their use is illegal without a doctor's prescription.

Yong and colleagues [3] found that e-cigarette use reduced the success of smoking cessation attempts in Australian and Canada, countries that had more restrictive regulations at the time. While the authors of that study acknowledged important limitations of their analysis, their suggestion, that the effect of e-cigarette use on smoking cessation success may depend on the regulatory environment, remains plausible.

There does not appear to be a population-level estimate for the effect of e-cigarette use on smoking cessation success in Australia to date. Without this, the public health impact of policies influencing rates of e-cigarette use in Australia will be highly uncertain.

This study presents results from analyses of 2019 National Drug Strategy Household Survey (NDSHS) data intended to infer the effect of e-cigarette use on smoking cessation success in Australia in 2019.

Materials and Methods

Survey-weighted multivariable logistic regression models with response and explanatory variables as described were fitted to responses from NDSHS respondents that attempted to quit smoking in the 12 months before the survey.

Response variable

The outcome of a quit attempt was used as the binary response variable. A successful quit attempt was defined as abstinence of more than a month at the time of the survey and self-assessed "ex-smoker" smoking status.

Study variable and covariates

The study or "treatment" variable was reported use of e-cigarettes for a smoking cessation attempt. People that used e-cigarettes "once or twice" were considered not to have used e-cigarettes.

The base model assumed that any use of e-cigarettes (beyond once or twice) had the same multiplicative effect on the odds of smoking cessation success. A second model was fitted that allowed the effect of vaping to depend on whether e-cigarettes were sourced from overseas websites or from other sources.

Demographic and smoking characteristics potentially associated with e-cigarette use and success of smoking cessation attempts were included in models as covariates. Explanatory variables included in the second fitted model and their effects are presented in Table 1.

Results

A total of 1608 respondents to the 2019 NDSHS with complete covariate data reported a quit attempt in the 12 months before the survey. Of these, 160 used e-cigarettes to aid their quit attempt. Overall, just less than a quarter of quit attempts were successful (point success rate: 0.239; 95% CI: $0.216 - 0.263$) according to the criteria defined earlier.

The fitted base logistic regression model suggested Australians that used e-cigarettes for a quit attempt had twice the odds of success of those that did not (aOR: 2.00; 95% CI: $1.28 - 3.11$; p = 0.002). Adjusted odds ratios for quit success derived from the second model are presented in Table 1.

Variable	aOR (95% CI)	p-value
Sex = female	1.17 (0.86 − 1.58)	0.361
Age factor (ref group: 14-30 yrs)		
Mid-age (31-50 yrs)	1.46 (1.00 − 2.14)	0.054
Senior (51+ yrs)	1.10 (0.67 − 1.80)	0.696
Psychological distress (ref group: Low)		
Medium	1.17 (0.83 − 1.65)	0.369
High/very high	0.82 (0.83 − 1.65)	0.332
Education level (ref group: I)		
II	0.89 (0.54 − 1.48)	0.660
III	1.18 (0.78 − 1.79)	0.443
IV	1.05 (0.66 − 1.69)	0.828
Employment status (ref group: Employed)		
Unemployed	1.20 (0.68 − 2.13)	0.533
Retired	1.43 (0.88 − 2.33)	0.154
Other	0.81 (0.52 − 1.25)	0.343
Remoteness (ref group: City)		
Inner regional	1.16 (0.80 − 1.70)	0.430
Outer regional/remote	0.71 (0.45 − 1.14)	0.157
Alcohol 3+ days per week	0.94 (0.68 − 1.30)	0.710
Non-daily smoker	2.75 (1.97 − 3.83)	<0.001
First cigarette <16 yrs of age	1.11 (0.82 − 1.49)	0.504
Avoid others' cigarette smoke (ref group: Never)		
Sometimes	1.53 (1.13 − 2.09)	0.006
Always	1.31 (0.78 − 2.19)	0.310
Asked doctor for help to quit	0.88 (0.51 − 1.50)	0.634
Used gum/spray/lozenge/patch	0.77 (0.50 − 1.17)	0.220
Stop smoking medication	1.19 (0.68 − 2.07)	0.540
Used quit smoking app	1.87 (1.09 − 3.23)	0.024
Called Quitline	0.51 (0.20 − 1.29)	0.158
E-cigarette source (ref group: No e-cigarettes)		
Overseas website	2.83 (1.29 − 6.24)	0.010
Other sources	1.74 (1.07 − 2.99)	0.028

Table 1: Adjusted odds ratios with 95 percent confidence intervals for explanatory variables included in binary logistic regression model for smoking success. Estimates pertaining to e-cigarette use are shaded yellow.

Sourcing e-cigarettes from overseas websites or from other sources were both associated with higher odds of quit success than attempts to quit without e-cigarettes (Table 1). While the point estimate for the effect of using e-cigarettes sourced from overseas websites was higher than for those from other sources, there is not significant evidence of a difference (Figure 1).
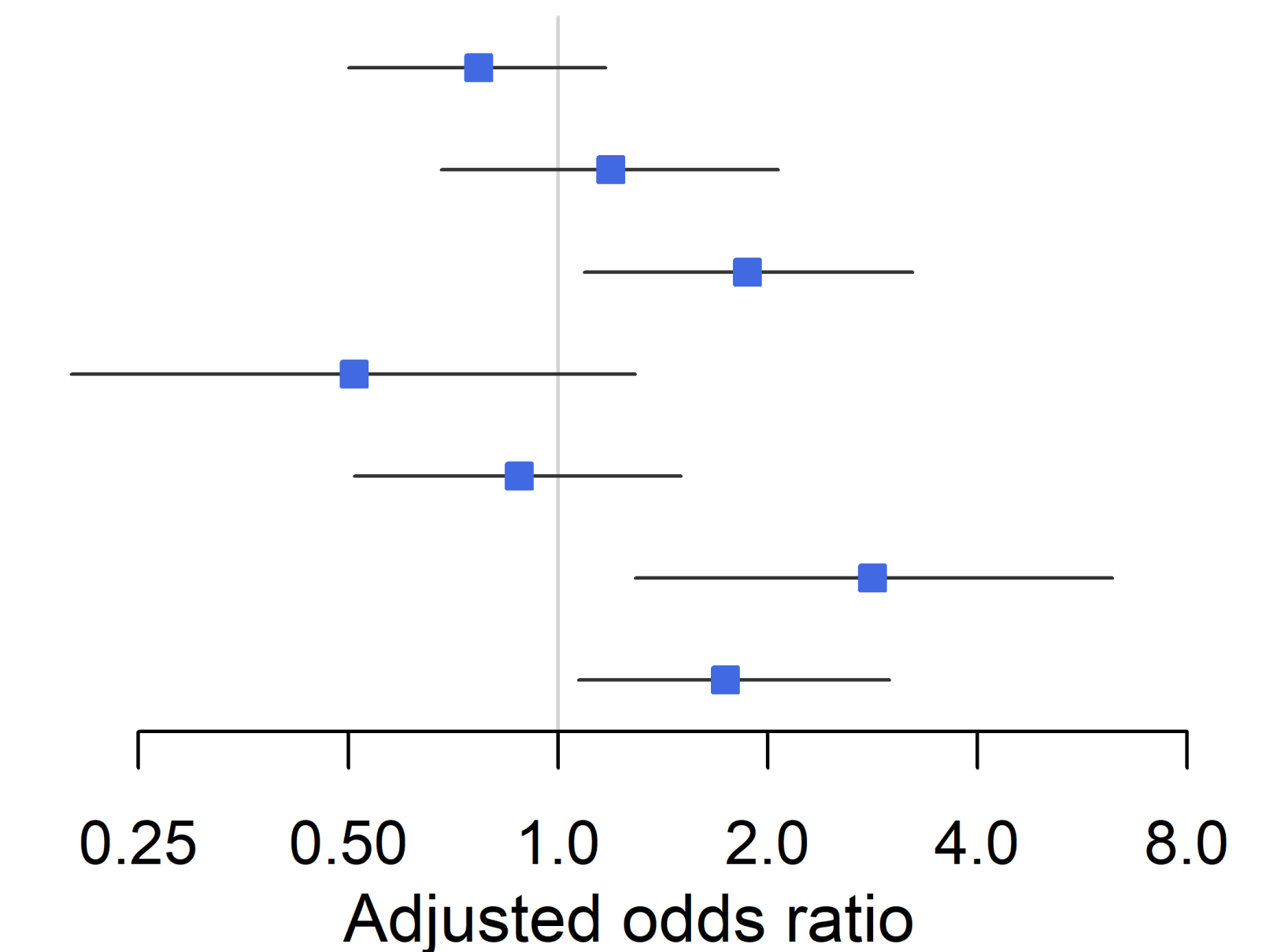

Figure 1: Multiplicative effect of smoking cessation strategies on the odds of success of attempts to quit tobacco smoking in 2019 relative to not using that strategy.

Conclusions

- Increased accessibility of nicotine e-cigarettes in Australia could improve the overall success of attempts by Australian smokers to quit tobacco cigarettes.

- Information on the prevalence of nicotine use in e-cigarettes among Australian vapers would enable a better understanding of how current policy on e-cigarettes will affect rates of smoking in the future.

- The benefits of potential improvements in success of quit attempts need to be weighed up against the risk that possibly increased popularity of e-cigarettes could lead to increased uptake of cigarette smoking.

References

[1] Australian Institute of Health and Welfare, *Burden of tobacco use in Australia: Australian Burden of Disease Study 2015*, AIHW technical report, 2019.

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[3] H.-H. Yong, S. C. Hitchman, K. M. Cummings, R. Borland, S. M. Gravely, A. McNeill and G. T. Fong, *Nicotine & Tobacco Research*, 2017, **19**, 1268–1276.

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