

THE USE OF VAPING PRODUCTS IN ATTEMPTS TO STOP SMOKING:
*Trends Over Time and Possible Substitution for Other Smoking Cessation Aids in Canada, the
United States, England, and Australia*

by
Kimberly D'Mello

A thesis
presented to the University of Waterloo
in fulfilment of the
thesis requirement for the degree of
Master of Science
in
Public Health Sciences

Waterloo, Ontario, Canada, 2024

© Kimberly D'Mello 2024

AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

ABSTRACT

Background: E-cigarettes are a popular method of smoking cessation assistance. However, few studies have examined whether e-cigarettes serve as a substitute for other effective smoking cessation assistance, including how population-level changes in the use of e-cigarettes for smoking cessation compare to changes in the use of nicotine replacement therapy (NRT), prescription pharmacological therapies, and other smoking cessation methods.

Objectives: To examine changes in the types of cessation assistance used by people trying to quit smoking over time, including: 1) the use of e-cigarettes in a quit attempt and 2) the use of other effective methods of cessation assistance.

Methods: The study protocol has been preregistered (<https://osf.io/jpnqc>). Data are from the 2016, 2018, and 2020 Waves of the ITC Four Country Smoking and Vaping Survey. Respondents were recruited by commercial panel firms in each country who were ≥ 18 years of age and, who currently smoke, recently quit smoking, and/or currently vape. Analyses examined the use of cessation assistance among the 14,551 observations from participants with an attempt to quit smoking in the past 12-months since survey date (CA=4,880; US=2,917; EN= 4,846; AU=1,898). Repeat cross-sectional analyses were conducted using generalized estimating equations stratified by country.

Results: Across all countries, e-cigarettes (29.9%) and nicotine replacement therapies (NRT; 29.8%) were the most commonly reported categories of cessation assistance used in a previous quit attempt, followed by self-help services (17.8%), and prescription pharmacological therapies (12.6%). Overall, more than half (59.4%) of respondents used ‘any’ form of effective cessation assistance (including e-cigarettes). E-cigarette use increased in Australia from 2016 (11.1%) to 2020 (25.1%; OR=2.29, 95% CI=1.37-3.82, $p=.002$). In England, e-cigarette use increased from 2016 (37.1%) to 2018 (46.7%; OR=1.40, 95% CI=1.13-1.73, $p=.002$), and had no changes over time in Canada or the US. Use of other effective cessation methods (with and without e-cigarettes) had no changes over time in all countries, excluding Canada. In Canada, use of ‘any’ form of effective cessation assistance (including e-cigarettes) decreased from 2016 (64.0%) to 2020 (58.9%; OR=0.75, 95% CI=0.61-0.93, $p=.010$).

Conclusion: Overall, there were strikingly similar rates of effective cessation assistance used across all four countries, despite differences in e-cigarette use and regulatory environments. While e-cigarettes are a popular choice of cessation method, there was little evidence that trends in use of e-cigarettes contributed to changes in the use of ‘any’ effective form of cessation assistance. The extent of ‘substitution’ between individual quit methods at the population-level was not directly assessed in this study; however, there was some evidence consistent with substitution for e-cigarettes and use of prescription therapies such that, the use of prescription therapies increased in England as the use of e-cigarettes as a quit method decreased, with the inverse trend in Australia; and little to no changes in the US and Canada.

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my supervisor Dr. David Hammond for his mentorship throughout the program. You have created a training program that has given me confidence as a researcher and importantly, been an extremely welcoming space to work along the Hammond Lab team. Thank you for your patience and understanding through the ups and downs of the program – I am grateful for all your guidance and encouragement across the various opportunities undertaken in my degree. Mostly, I am thankful that you have shown me that it is OK (and also necessary) to say ‘no’ when your plate is full, that it is important to enjoy life outside of work, and that a sweet treat is always a great way to get through meetings. As one of my very first professors (ever), it has truly been a privilege to complete my Master’s degree under your supervision. I cannot wait to see what comes next.

I am tremendously grateful to my committee members Dr. Geoffrey Fong and Dr. Katherine East for your expertise, knowledge, and time to this project. Thank you for your thoughtful feedback, discussion, and excitement towards my work, it has been a wonderful experience to learn from you both.

Thank you to the many mentors, peers, and friends who have added layers of richness to my degree. First, to the incredible Nicotine Research Group at King’s College London – Dr. Ann McNeill, Dr. Leonie Brose, Dr. Debbie Robson, Dr. Erikas Simonavičius, Dr. Katherine East, Dr. Eve Taylor, Matilda Nottage, and so many more. My time in the UK was easily the highlight of this experience (and there has been so much good to choose from!) greatly in thanks to all of you embracing me as part of your research group. I learned so much from you in my short time that I will absolutely carry along my career. I am counting the days until I can be back abroad. To the many professors across the SPHS department who have supported me through undergrad and beyond, thank you for making Waterloo a great school to belong to. It’s been a pleasure to turn office hour visits into conference coffees. And to the ITC team – specifically Jamie Wheeler – your time has been beyond invaluable in navigating this data for the first time. I am so thankful for your patience and willingness to help every step of the way.

To the Hammond lab, it has been a dream to be part of this team. Thank you for really making work fun – especially decorating the student office (our second home). Tuesdays will forever be for bagels and lab days. Remember to look after Julian! A special thanks to Jess for holding all the answers to life at the lab and beyond, Vicki for your time troubleshooting SAS, and Liza for being there from (actually) day 1.

I could not have completed this degree without the support of my friends and family (and an iced capp). A special shoutout to Laura for becoming my first teams-friend turned real life. I am so glad we did this together. Thank you to the Tyas lab – Emily, Carrie, and Laura – for adopting me into writing group, the GSA, and cheering each other on through milestones along the way. To my friends who listened to my defence, conference practices in my living room, who flew to visit me abroad, and celebrated every little win – I love you. To all my friends and family, thank you for always asking about my work, even when it doesn’t seem to make much sense, and telling anyone who will listen that Kim got her Master’s!

TABLE OF CONTENTS

AUTHOR'S DECLARATION.....	ii
ABSTRACT.....	iii
ACKNOWLEDGEMENTS	iv
LIST OF FIGURES.....	vi
LIST OF TABLES	vii
LIST OF ABBREVIATIONS	x
1.0 BACKGROUND	1
1.1 <i>The public health burden of smoking</i>	1
1.2 <i>Smoking cessation: methods for quitting</i>	1
1.3 <i>Effectiveness of e-cigarettes for smoking cessation</i>	1
1.4 <i>Use of e-cigarettes during smoking cessation attempts: population-level prevalence</i>	2
1.5 <i>Population-level changes in smoking cessation rates</i>	2
1.6 <i>E-cigarettes as a substitute for other smoking cessation aids</i>	3
2.0 RESEARCH OBJECTIVES	5
3.0 METHODS.....	6
3.1 <i>Research design and collection</i>	6
3.2 <i>Sample</i>	6
3.3 <i>Measures</i>	6
3.4 <i>Analysis</i>	8
3.5 <i>Ethics</i>	10
4.0 RESULTS	12
4.1 <i>Sample characteristics</i>	12
4.2 <i>Use of cessation assistance – categories</i>	12
4.3 <i>Use of effective cessation assistance (excl. e-cigarettes)</i>	27
4.4 <i>Use of 'any' effective cessation assistance (incl. e-cigarettes)</i>	31
5.0 DISCUSSION.....	33
5.1 <i>Overall use of cessation assistance during an attempt to quit smoking</i>	33
5.2 <i>E-cigarettes for smoking cessation</i>	34
5.3 <i>Trends in use of 'other' cessation assistance methods</i>	37
5.4 <i>Sociodemographic factors associated with use of cessation assistance</i>	38
5.5 <i>Limitations</i>	39
6.0 CONCLUSION	41
REFERENCES.....	42
APPENDIX	51

LIST OF FIGURES

Figure 1. Any use of cessation assistance category among people with an attempt to quit smoking in the past 12-months in Canada, the United States, England, and Australia, 2016-2020	14
Figure 2. Any use of e-cigarettes among people with an attempt to quit smoking in the past 12-months.	15
Figure 3. Any use of nicotine replacement therapy (NRT) among people with an attempt to quit smoking in the past 12-months.	17
Figure 4. Any use of prescription pharmacological therapy among people with an attempt to quit smoking in the past 12-months.	19
Figure 5. Any use of telephone/quitline services among people with an attempt to quit smoking in the past 12-months.	21
Figure 6. Any use of counselling services among people with an attempt to quit smoking in the past 12-months.	23
Figure 7. Any use of self-help services among people with an attempt to quit smoking in the past 12-months.	25
Figure 8. Any use of effective cessation assistance category among people with an attempt to quit smoking in the past 12-months in Canada, the United States, England, and Australia, 2016-2020.	28
Figure 9. Any use of effective cessation assistance (excl. e-cigarettes) among people with an attempt to quit smoking in the past 12-months.	29
Figure 10. Use of ‘any’ effective cessation assistance (incl. e-cigarettes) among people with an attempt to quit smoking in the past 12-months.	31

Appendix Figures

Figure A1. Aids used in most recent quit attempt: data from smoking toolkit study, England. ...	51
--	----

LIST OF TABLES

Table 1. Total analytic sample who reported an attempt to quit smoking in the 12 months prior to the survey date – after excluding observations with missing data.	8
Table 2. Sample characteristics of people with an attempt to quit smoking in the past 12-months in Canada, the United States, England, and Australia from 2016 – 2020*	11
Table 3. Any use of cessation assistance among people with an attempt to quit smoking in the past 12-months months in Canada, the United States, England, and Australia from 2016 – 2020*	12
Table 4. Any use of effective cessation assistance among people with an attempt to quit smoking in the past 12-months months in Canada, the United States, England, and Australia from 2016 – 2020.	27

Appendix Tables

Table A1. Derived categories of cessation assistance method used at last quit attempt	52
Table A2. Any use of cessation assistance among people with an attempt to quit smoking in the past 12-months months in Canada (n=4,880)*	53
Table A3. Any use of cessation assistance among people with an attempt to quit smoking in the past 12-months months in the United States (n=2,912)*	54
Table A4. Any use of cessation assistance among people with an attempt to quit smoking in the past 12-months months in England (n=4,486)*	55
Table A5. Any use of cessation assistance among people with an attempt to quit smoking in the past 12-months months in Australia (n=1,898)*	56
Table A6. GEE results examining any use of an e-cigarette during an attempt to quit smoking in the past 12-months among respondents in England, 2016-2020 (n=4,846)	57
Table A7. GEE results examining any use of an e-cigarette during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880)	58
Table A8. GEE results examining any use of an e-cigarette during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)	59
Table A9. GEE results examining any use of an e-cigarette during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)	60
Table A10. GEE results examining any use of nicotine replacement therapy (NRT) during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)	61
Table A11. GEE results examining any use of nicotine replacement therapy (NRT) during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880)	62
Table A12. GEE results examining any use of nicotine replacement therapy (NRT) during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)	63

Table A13. GEE results examining any use of nicotine replacement therapy (NRT) during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)	64
Table A14. GEE results examining any use of prescription pharmacological therapy during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)	65
Table A15. GEE results examining any use of prescription pharmacological therapy during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,833)*	66
Table A16. GEE results examining any use of prescription pharmacological therapy during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)	67
Table A17. GEE results examining any use of prescription pharmacological therapy during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)	68
Table A18. GEE results examining any use of telephone/quitline services during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846).....	69
Table A19. GEE results examining any use of telephone/quitline services during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880)	70
Table A20. GEE results examining any use of telephone/quitline services during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,896)*	71
Table A21. GEE results examining any use of telephone/quitline services during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)	72
Table A22. GEE results examining any use of counselling services during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)	73
Table A23. GEE results examining any use of counselling services during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880).....	74
Table A24. GEE results examining any use of counselling services during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912).....	75
Table A25. GEE results examining any use of counselling services during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898).....	76
Table A26. GEE results examining any use of self-help services during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)	77
Table A27. GEE results examining any use of self-help services during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880).....	78
Table A28. GEE results examining any use of self-help services during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912).....	79
Table A29. GEE results examining any use of self-help services during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898).....	80
Table A30. GEE results examining any use of effective cessation assistance (excl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)	81

Table A31. GEE results examining any use of effective cessation assistance (excl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880) ...	82
Table A32. GEE results examining any use of effective cessation assistance (excl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)	83
Table A33. GEE results examining any use of effective cessation assistance (excl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898) .	84
Table A34. GEE results examining any use of effective cessation assistance (incl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)	85
Table A35. GEE results examining any use of effective cessation assistance (incl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880)	86
Table A36. GEE results examining any use of effective cessation assistance (incl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)	87
Table A37. GEE results examining any use of effective cessation assistance (incl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)	88

LIST OF ABBREVIATIONS

AU	Australia
CA	Canada
CTNS	Canadian Tobacco Nicotine Survey
EN	England
GEE	Generalized Estimating Equations
HTP	Heated Tobacco Product
ITC	International Tobacco Control
ITC 4CV	International Tobacco Control Policy Evaluation Project 4-Country Smoking and Vaping Survey
MEPS	Medical Expenditures Panel Survey
NDSHS	National Drug Strategy Household Survey
NRT	Nicotine Replacement Therapy
NVP	Nicotine Vaping Product
PATH	Population Assessment of Tobacco and Health
PPT	Prescription Pharmacological Therapies
STS	Smoking Toolkit Study
TUS-CPS	Tobacco Use Supplement Current Population Survey
US	United States

1.0 BACKGROUND

1.1 The public health burden of smoking

Despite notable reductions in the prevalence of tobacco use worldwide, smoking remains a leading preventable cause of death across the world (1). Much of the progress to date is attributable to tobacco control policies, which have been particularly effective in reducing smoking initiation among young people (1,2). Policies have also sought to promote smoking cessation for which nicotine addiction represents a considerable barrier. Regardless of age, smoking cessation improves quality of life and reduces the risk of dying from smoking-related illness (3).

1.2 Smoking cessation: methods for quitting

There are several approved methods for smoking cessation, including nicotine replacement therapies (NRT; gum, transdermal patch, lozenge, etc.), prescription pharmacological therapies (PPT; varenicline, bupropion, and cytisine); and behavioural interventions (e.g., counselling services, clinical interventions, telephone/quitlines, cessation website/app, tailored self-help materials, etc.) (3–5). Each method of cessation assistance operates through a different mechanism of action to reduce smoking. NRT aids the transition from smoking to abstinence by offering replacement forms of nicotine that are otherwise obtained from cigarettes. This leads to reduced motivation to smoke and nicotine withdrawal symptoms (6). For PPT, the specific mechanisms of action will vary based on the medication that is used. In general, these medications act directly on physiological processes to eliminate or significantly reduce the reinforcing effects of nicotine by desensitizing nicotinic receptors in the body (3). Behavioural interventions seek to address learned processes directly related to smoking in addition to ongoing contextual factors that impede one's ability to quit. These interventions offer different forms of aid including strategies to identify triggers and manage withdrawal symptoms to promote longer-term abstinence (3). These approved cessation aids and behavioural interventions are proven to increase the likelihood of smoking cessation when used individually or combined (3,7).

1.3 Effectiveness of e-cigarettes for smoking cessation

There is increasing evidence that electronic cigarettes (e-cigarettes) can be an effective smoking cessation aid when used for the purpose of quitting smoking (5). E-cigarettes are electronic devices that heat an e-liquid typically containing nicotine to produce an aerosol that is inhaled by the user (8). Compared to smoking, e-cigarettes are a less harmful method of nicotine consumption (9) because e-cigarettes do not involve combustion, which is primarily responsible for the toxic compounds leading to the adverse health effects of smoking (10,11). Although e-cigarette aerosol contains several toxicants that are harmful to human health and there remains considerable uncertainty about the level of harm from vaping, e-cigarettes are almost certainly less harmful than smoking (9).

Evidence from randomized controlled trials indicate that e-cigarettes are an equally or possibly more effective smoking cessation method than conventional forms of NRT (8,12). E-cigarettes containing nicotine have been shown to increase quit rates compared to use of NRT, with a high certainty of evidence (12). E-cigarettes likely have a similar mechanism of action as conventional NRT products—delivering nicotine to help individuals manage nicotine craving and

withdrawal symptoms (6)—in addition to mimicking many of the behavioural aspects of smoking (13–15). The efficacy of e-cigarettes as a cessation aid may vary depending on several product attributes, including device type and the nicotine profile of e-liquid, including both the nicotine concentration and salt versus free-base nicotine formulations (13,14,16,17).

The effectiveness of e-cigarettes as a smoking cessation aid in ‘real world’ situations also depends on patterns of use. When used daily for the purpose of quitting, observational studies suggest that nicotine-containing e-cigarettes can be an effective form of cessation (9,18,19). When used on a less frequent basis or for reasons other than quitting smoking, e-cigarettes do not increase smoking cessation and may be associated with a lower likelihood of quitting smoking. Thus, in prospective cohorts and population-based studies, the effectiveness of e-cigarettes for smoking cessation is mixed (18,20,21). One consistent finding has emerged which helps to reconcile the findings across different studies: daily or frequent vaping is associated with increased smoking cessation; however, less frequent vaping is associated with no impact or a negative impact on smoking cessation (18,20,22–29).

Overall, there is strong evidence of the efficacy of e-cigarettes as a smoking cessation aid in clinical trials, whereas the effectiveness of e-cigarettes in ‘real world’ settings is more mixed, based on highly variable patterns of use in naturalistic settings (7).

1.4 Use of e-cigarettes during smoking cessation attempts: population-level prevalence

No e-cigarette has received approval as a smoking cessation aid to date (3). Nevertheless, vaping is an increasingly common method of quitting smoking in many high-income countries. (30–33). For example, in 2020, approximately one-quarter of all adults who tried to quit smoking reported using e-cigarettes to help them quit, including in Australia (22%), the United States (25%), Canada (27%), and England (27%) (30–33).

National monitoring surveys in Canada and the US indicate that, other than general behavioural strategies such as ‘cutting back’, e-cigarettes are either the most popular or among the most widely used forms of cessation assistance (30,31). E-cigarettes are a particularly popular method of quitting among younger people who smoke: for example, 44% of young adults aged 20-24 in Canada used vaping as a method to quit smoking in 2022, compared to 15% of those aged 45 and over (34). In the case of England, several studies indicate that vaping is now the most popular quit method among adults trying to quit smoking compared to over-the-counter NRT, prescription medications, and other formal methods of cessation assistance (35,36). Overall, e-cigarettes are now well-established as a common form of cessation assistance among people trying to quit smoking.

1.5 Population-level changes in smoking cessation rates

Population-level indicators of smoking cessation are typically evaluated based on the percentage of people smoking who have since stopped smoking within a given year (cessation rate), the percentage of people who make an attempt to quit smoking (cessation attempt), and the percentage who remain abstinent among those who have made a cessation attempt (cessation success). These indicators are often based on point prevalence in national monitoring surveys.

E-cigarettes have the potential to increase population-level smoking cessation rates in two main ways. First, e-cigarette use has the potential to increase the number of cessation attempts among those who smoke (37,38). Second, e-cigarettes could increase the likelihood of cessation success among those that attempt to quit (38). Collectively, these two factors determine the population smoking cessation rate in regard to the percentage of current smoking individuals who quit smoking each year.

Overall, countries have observed somewhat different trajectories in smoking cessation rates over the period in which e-cigarettes have emerged as a popular method of cessation assistance. In Canada, the percentage of people who smoked who make a cessation attempt and the prevalence of cessation success has remained relatively unchanged for the past two decades (39,40). In the US, overall cessation rates have been steadily increasing for the past three decades, with accelerated increases observed since 2014. In the period from 2014 to 2019, cessation rates rose, which could reflect the increasing availability of e-cigarettes as an alternative method of nicotine delivery products on the market (37,41,42). In England, the smoking cessation rate increased between 2013 to 2016 in the post-e-cigarette period, before declining from 2017 to 2019 to similar levels in the pre-e-cigarette period (36,43). To our knowledge, there is no data available on population-level cessation rates in Australia.

1.6 E-cigarettes as a substitute for other smoking cessation aids

In general, smoking cessation policies have sought to increase the use of ‘any’ effective smoking cessation assistance—rather than promoting certain forms of assistance over others—on the basis that individuals should tailor their choice of assistance based on prior experiences and individual preference. The impact of e-cigarettes—or any other novel cessation assistance—would be greatest if e-cigarettes increased the ‘net’ proportion of those quitting who use any form of effective assistance. Alternatively, it is also possible that e-cigarettes serve as a substitute for other effective forms of cessation assistance (7). In other words, rather than increasing the number of people smoking who are using an effective cessation method, individuals may be using e-cigarettes in place of other effective forms of cessation. The overall effect of this phenomenon would be to attenuate the benefit of e-cigarettes on population-level cessation rates.

There is little research to date on the extent to which e-cigarettes have been substituted for other cessation assistance. One study conducted in England examined population-level cessation rates between 2007-2017 and found that e-cigarettes were associated with a higher cessation success rate and an increase in the overall number of people who quit smoking (44). In contrast, national monitoring surveys indicate that some forms of cessation assistance have decreased as the use of e-cigarettes for quitting has increased. For example, in Canada, the use of NRT during quit attempts decreased as the use of vaping products to quit smoking has increased (45,46). The same phenomenon has been observed in England (see Figure A1, Appendix) (35,36). In addition, a study examining the use of cessation assistance among people who smoke in Canada, England, Australia, and the US found an inverse association between the use of vaping for cessation assistance and the use of NRT at the population level: compared to the US and Australia, people currently smoking in England and Canada were more likely to use e-cigarettes in a quit attempt, but less likely to use NRT, such that the overall number of people

currently smoking who reported using ‘formal’ cessation assistance was very similar across the four countries (32). Finally, a US study examined sales data between 2010 and 2015, and found that greater e-cigarette advertising and sales was associated with lower use of nicotine gum patches, the two most common forms of NRT (47). Overall, there is preliminary evidence that e-cigarettes may be acting at least as a partial ‘substitute’ for other effective cessation aids (48); however, the extent to which this has occurred remains unclear due to a lack of research.

Summary

Smoking remains a leading preventable cause of death across the world (1). Governments in Canada, the US, England, and Australia have all set targets to reduce smoking prevalence to 5% by 2030 through their respective National Tobacco Strategies (49–52). These goals cannot be achieved through reductions in smoking prevention alone: increases in overall smoking cessation rates will be needed to meet these targets. The extent to which e-cigarettes can contribute to these goals is a critically important question. There is increasing evidence that daily or frequent use of e-cigarettes is an effective method of cessation assistance; however, the extent to which they can increase population-level cessation rates remains unknown. To better understand the public health impact of vaping, it is essential to evaluate the extent to which e-cigarettes increase the overall use of cessation assistance among people smoking, rather than simply displacing other effective forms of assistance.

2.0 RESEARCH OBJECTIVES

The overall objective of this thesis is to examine how the rise in using e-cigarettes for smoking cessation compares to trends in the use of other effective cessation assistance such as nicotine replacement therapy (NRT), prescription pharmacological therapies (PPT), counselling services, telephone/quitlines, and self-help assistance methods in Canada, the United States, England, and Australia. The study addressed three specific research questions:

1. Among people who have made a recent quit attempt, how does the use of e-cigarettes as a form of cessation assistance compare to trends in the use of other forms of effective cessation assistance between 2016 – 2020?

Hypothesis 1: The use of e-cigarettes for cessation assistance will increase across the years while trends in the use of other effective methods of cessation assistance will decline consistent with patterns of at least 'partial substitution'.

2. Do trends in the use of e-cigarettes for smoking cessation and the use of other effective cessation assistance differ within the four countries?

Hypothesis 2a: During a quit attempt, trends in the use of 'any' effective method of quitting (including e-cigarettes) will be the same across countries.

Hypothesis 2b: E-cigarette use for cessation assistance will be higher in countries with more permissive e-cigarette policies (e.g., England), compared to countries with more restrictive policies (e.g., Australia).

3. Does the use of e-cigarettes for smoking cessation and the use of other effective cessation assistance differ among sociodemographic factors, including age, sex-at-birth, ethnicity, income, education, or perceived addiction to cigarettes?

Hypothesis 3: The greatest increases in e-cigarette use for smoking cessation will be observed among younger participants.

3.0 METHODS

3.1 Research design and collection

The study used data from Wave 1 (2016), Wave 2 (2018), and Wave 3 (2020) of the International Tobacco Control (ITC) Policy Evaluation Project 4-Country Smoking and Vaping (4CV) Survey. The ITC 4CV Survey is a cohort study that consists of parallel online surveys conducted in Canada, the United States (US), England, and Australia (53). Online surveys were conducted from July to November 2016 (Wave 1), February to July 2018 (Wave 2), and February to June 2020 (Wave 3) (53). This study employed repeat cross-sectional analyses of Waves 1-3 as described below. The study protocol has been preregistered on the open science registry (<https://osf.io/jpnqc>). Complete methodological details for each country are available in the technical report published on the ITC website (<https://itcproject.org/methods>).

3.2 Sample

3.2.1 Overall ITC Survey Sample

Respondents recruited for the ITC 4CV Surveys include individuals ≥ 18 years of age who currently smoke (smoke $\geq$ monthly, and at least 100 cigarettes in their lifetime), people who report quitting smoking in the past 2 years, and people who report vaping (vape $\geq$ weekly). Respondents were recruited by commercial panel firms in each country and used either probability-based sampling frames or non-probability opt-in sampling frames, or a combination of these to be representative of people smoking (53). Participants were re-contacted at each follow-up wave. Participants lost to attrition were ‘replenished’ in each wave with newly recruited respondents (53). As a result, participants in the current analysis could contribute data to 1, 2, or all 3 survey waves.

3.3 Measures

A copy of the complete ITC 4CV surveys, including all measures described below, is available at <https://itcproject.org/surveys/>.

3.3.1 Socio-demographic variables

Respondents provided demographic information, including country of residence, sex-at-birth, age group, ethnicity/race, highest education level, and annual household income. Briefly, ethnicity/race was assessed with country-specific measures that were analysed as a binary variable of majority vs. minority, drawn from census or benchmark health surveys.

3.3.2 Smoking behaviour

Frequency of cigarette smoking was assessed by asking, “How often, if at all, do you currently smoke ordinary cigarettes (either factory-made/packet or roll-your-own)?” A derived variable of smoking status at the current wave was created to categorize respondents who reported daily or non-daily frequency of smoking cigarettes.

3.3.3 Attempts to quit smoking

Respondents were asked about the timing of their attempt(s) to quit smoking. Different wording was used depending on participant groups characterized as people who had quit smoking (former smoking) and those who currently smoke (current smoking) in the sections below. Former smoking individuals were asked, “How long ago did you quit smoking” (Wave 1),

or “How long ago did your current quit attempt?” (Waves 2-3). Respondents who currently smoke were asked, “How many times, if any, have you tried to quit in the past 12 months?” (Wave 1), or “How many times, if any have you tried to quit since last survey date?” (Waves 2-3). If respondents had made at least one quit attempt, they were asked, “How long ago did your most recent quit attempt start?”. A measure of all respondents who had attempted to quit smoking in the 12 months prior to the survey date was derived from these measures.

3.3.4 Use of self-reported cessation assistance

Respondents who made at least one quit attempt were asked, “Did you use an e-cigarette/ vaping device on your last (current smoking) / current (former smoking) quit attempt?” (Yes, No, Refused, Don't know). For the use of other cessation assistance, respondents were asked: “Which of the following forms of help did you receive or use as part of your last (current smoking) / current (former smoking) quit attempt?”. Respondents could select from the following aids (multiple options were allowed to be selected): (1) NRT; (2) varenicline (Chantix™ or Champix); (3) bupropion (Zyban or Wellbutrin); (4) cytisine (Cravv) (wave 2-3); (5) telephone or quitline service; (6) counselling/clinic/program; (7) smoking cessation session(s) offered by your doctor; (8) mobile apps; (9) cessation website; (10) pamphlets or brochures; (11) Smokeless tobacco -- i.e. snus, chew, or dip. (US/CA only); (12) heated tobacco product (e.g., IQOS) (wave 2-3); (13) other type of aid not mentioned above (open-ended); (14) none of the above.

Among those who selected NRT as part of their most recent quit attempt, the specific form of NRT was assessed. Respondents were asked: “Which of the following nicotine replacement product or products did you use for this last (current smoking) / current (former smoking) quit attempt?”. Respondents could select from the following aids (multiple options were allowed to be selected): (1) nicotine patch; (2) nicotine gum; (3) nicotine lozenges; (4) nicotine mouth spray; (5) nicotine inhaler/ inhalator (e.g., Voke); (6) nicotine sublingual tablets; (7) nicotine dissolvable oral strips; (8) nicotine nasal spray; (9) other type of aid not mentioned above (open-ended).

3.3.5 Derived categories of cessation assistance

Overall, ITC measures yield 23 individual forms of cessation assistance – see Appendix Table 1 (A1). Derived variables were created to categorize forms of cessation assistance as described below.

3.3.5.1 Use of Cessation Assistance - Categories

Individual forms of cessation assistance were grouped into seven categories, as shown in the Appendix: (1) e-cigarette/vape; (2) nicotine replacement products (NRT); (3) prescription pharmacological therapies (PPT); (4) telephone/quitline services; (5) counselling services; (6) self-help materials (see A1). These categories are not mutually exclusive, and respondents could report more than one form of cessation assistance.

3.3.5.2 Use of Effective Cessation Assistance (excluding e-cigarettes)

A dichotomous variable was created to characterize the use of any effective cessation assistance at the last quit attempt, excluding e-cigarettes. Effective forms of cessation assistance were based on clinical practice guidelines and evidence reviews (7,54). This variable

captures observations of responding ‘yes’ to any use of: NRT, PPT, telephone/quitline services, and counselling services. For the purpose of examining potential substitution effects, this variable will exclude e-cigarettes from the group of ‘Effective Cessation Assistance’.

3.3.5.3 Use of ‘Any’ Effective Cessation Assistance (including e-cigarettes)

Another dichotomous variable was created to include the use of ‘any’ effective assistance including e-cigarettes. This variable captured observations of responding ‘yes’ to any use of e-cigarettes, NRT, PPT, telephone/quitline services, and counselling services.

3.4 Analysis

All analyses were conducted using ‘main sample’ respondents from the ITC 4CV datasets. Further information is available in the technical reports for each survey (53,55,56). A total of 36,803 valid observations were collected across Waves 1 to 3, including Canada (CA; n= 11,161), the United States (US; n= 8,086), England (EN; n= 13,054), and Australia (AU; n= 4,502).

The current analyses focus on the sub-sample of respondents who reported an attempt to quit smoking in the 12 months prior to the survey date (n=14,855 observations; CA=4,973; US=2,985; EN= 4,973; AU=1,924). A total of 7 observations were excluded due to missing data on ethnicity, and 297 observations were excluded due to missing data on the use of cessation assistance method (CA=93; US=68; EN= 120; AU=16). An additional 15 observations were removed due to convergence problems in GEE models where participants did not state their ethnicity or education level (US=5, AU=10). A final analytic sample of 12,155 unique respondents and 14,536 observations across 3 survey waves (CA=4,880; US=2,912; EN= 4,846; AU=1,896) are included in this study—see Table 1.

Table 1. Total analytic sample who reported an attempt to quit smoking in the 12 months prior to the survey date – after excluding observations with missing data.

Country	2016 (n = 5,881)	2018 (n = 4,742)	2020 (n = 3,928)	TOTAL (n = 14,536)
Canada (CA)	1,887	1,572	1,421	4,880
United States (US)	1,237	945	730	2,912
England (EN)	1,950	1,644	1,252	4,846
Australia (AU)	796	578	524	1,898

3.4.1 Weighting procedures

All analyses were weighted using cross-sectional sampling weights to adjust for the oversampling of 18–24 years old tobacco users, the oversampling of nicotine vaping product (NVP) users, e-cigarette users, and (starting at wave 3) heated tobacco products (HTP) users, sample misrepresentation, non-response, and other biases. Additional detail on the construction of the post-stratification survey weights is available in the technical report (53). Weights were rescaled to the unweighted sample size of respondents in each country at each wave.

3.4.2 Sensitivity Analysis

Three GEE models were fitted to explore the effect of time (i.e., survey ‘wave’) across different levels of cessation use outcomes, adjusting for ‘time in sample’. First, one model was run which only included time-in-sample, another included survey wave only, and a third model was run which fits effects of both survey wave and time in sample. Across the individual cessation assistance (e-cigarette use) and effective cessation assistance (including e-cigarettes) models, the GEE fit criteria (QIC values) were smaller in models including both survey wave and time in sample, indicating better fit. One model for effective cessation assistance (excluding e-cigarettes) had higher GEE fit criteria; however, results were not significantly different and therefore both covariates were kept in the final models.

3.4.3 Descriptive analyses

Descriptive statistics (stratified by year and country) were used to characterize the frequency of each of the 23 specific forms of cessation assistance recorded in the ITC Surveys and each of the three derived variables for use of cessation assistance as outlined in Table A1.

3.4.4 Multivariate analyses

Repeat cross-sectional analyses were conducted using generalized estimating equations (GEE) to model outcomes stratified by country. In all cases, models included the variables for survey year, as well as the following covariates: age group, sex-at-birth, education, income, ethnicity, perceived addiction to cigarettes, and time-in-sample. Adjusted odds ratios, exact p-levels to 3 decimal places, and 95% confidence intervals are reported.

3.4.4.1 Changes in the Use of Cessation Assistance – Categories

A binary GEE model was conducted to examine changes over time in each of the 6 cessation assistance categories. For example, a GEE model was run to examine the prevalence of using e-cigarettes as cessation assistance in the last quit attempt (0=no vs. 1=yes), while a separate GEE model was used to examine the prevalence of using any form of NRT in the last quit attempt (0=no NRT use vs. 1=NRT use), and so on.

3.4.4.2 Changes in the Use of Effective Cessation Assistance (excluding e-cigarettes)

A binary GEE regression model was conducted to examine changes in the Use of Effective Cessation Assistance (excluding e-cigarettes). This model was run to examine the prevalence of using effective cessation assistance in the last quit attempt (0=no vs. 1=yes).

3.4.4.3 Changes in the Use of ‘Any’ Effective Cessation Assistance (including e-cigarettes)

A binary GEE regression model was conducted to examine changes in the Use of ‘Any’ Effective Cessation Assistance (including e-cigarettes). As above, this model was run to examine the prevalence of using ‘any’ effective cessation assistance in the last quit attempt (0=no vs. 1=yes).

3.4.5 Pre-registration

The current study pre-registered an analysis plan on the open science registry (<https://osf.io/jpnqc>). Four main changes were made to the planned analysis to best fit the data in the project. 1) The analysis plan included data from four waves of the ITC project, whereas the current analysis only includes three waves of ITC data due. Wave 4 (2022) data was

excluded due to changes in the question wording and survey flow regarding use of cessation aids during an attempt to quit smoking. Prior to Wave 4, a 'stand-alone' question was asked to assess if respondents had used e-cigarettes in their most recent quit attempt. In Wave 4, the e-cigarette question was folded into a pre-existing checklist of other cessation aids, which led to notable decreases in the prevalence of e-cigarette use in a quit attempt in all countries compared to previous waves. 2) The GEE models in this analysis were not run with the predicted marginal standardization method (PREDMARG) as outlined in the pre-registration plan as this could not be handled through the GENMOD procedure in SAS. 3) Analyses presented in this paper were run as main effects models stratified by country instead of including all countries in the same model as outlined in the pre-registration plan. The primary research objective was to explore how changes in the prevalence of using e-cigarettes as a cessation aid compares to trends in the use of other cessation aids within the same population over time; therefore, stratifying models by country represented a better fit with the focus on within-country changes over time. 4) Finally, the current analysis did not assess three-way interactions between country, survey year, and sociodemographic characteristics due to restrictions on time and length of this project. No changes were made to any survey measures, hypotheses, or research questions included in the published registration (57).

3.5 Ethics

This study was reviewed by and received clearance from the University of Waterloo Office of Research Ethics (ORE #44902). The survey protocols and all materials of Wave 1, Wave 2, and Wave 3 of the ITC Four Country Smoking and Vaping Survey, including survey questionnaires, were reviewed and received clearance from research ethics committees at the following institutions: University of Waterloo, Canada (ORE#20803/30570, ORE#21609/30878); King's College London, UK (RESCM-17/18-2240); Cancer Council Victoria, Australia (HREC1603), and University of Queensland, Australia (2016000330/HREC1603). Research ethics committee reviews were waived at the University of Melbourne (Melbourne, Australia) and the Medical University of South Carolina. All participants provided consent to participate.

Table 2. Sample characteristics of people with an attempt to quit smoking in the past 12-months in Canada, the United States, England, and Australia from 2016 – 2020*

	2016 (n=5,870)	2018 (n=4,739)	2020 (n=3,927)	TOTAL (n=12,155)
Country	% (n)	% (n)	% (n)	% (n)
Canada	30.6 (1800)	31.9 (1572)	33.6 (1320)	30.7 (3731)
USA	20.2 (1184)	20.8 (987)	18.6 (731)	19.8 (2399)
England	34.3 (2013)	33.3 (1581)	32.0 (1257)	35.6 (4333)
Australia	14.9 (873)	13.9 (659)	15.8 (619)	14.0 (1693)
Age Group				
18-24	15.8 (931)	15.3 (726)	14.0 (668)	17.4 (2119)
25-39	34.1 (2020)	36.1 (1711)	34.0 (1336)	35.2 (4277)
40-54	26.9 (1576)	26.4 (1250)	27.1 (1063)	26.1 (3171)
55 and up	22.9 (1343)	22.2 (1052)	21.9 (861)	21.3 (2588)
Sex				
Female	46.0 (2698)	47.8 (2265)	45.2 (1774)	46.1 (5608)
Male	54.0 (3172)	52.2 (2474)	54.8 (2153)	53.9 (6547)
Time in Sample				
in 1 wave	100.0 (5870)	53.4 (2530)	53.8 (2112)	88.2 (10719)
in 2 waves	-	46.6 (2209)	19.9 (781)	9.7 (1177)
in 3 waves	-	-	26.4 (1035)	2.1 (259)
Ethnicity				
White (CA, US & EN) or English (AU)	85.6 (5027)	83.0 (3932)	80.9 (3178)	83.2 (10112)
Non-white (CA, US & EN) or non-English (AU)	13.2 (777)	15.7 (744)	18.2 (717)	15.6 (1900)
Not stated	1.2 (67)	1.4 (64)	0.8 (33)	1.2 (143)
Education				
Low	30.4 (1783)	29.4 (1392)	24.2 (951)	28.5 (3458)
Moderate	48.6 (2850)	47.9 (2269)	52.6 (2065)	50.2 (6097)
High	19.9 (1167)	21.9 (1038)	22.4 (878)	20.3 (2466)
Not stated	1.2 (70)	0.8 (40)	0.9 (34)	1.1 (133)
Income				
Low	23.5 (1382)	23.7 (1121)	25.2 (990)	23.9 (2905)
Moderate	28.5 (1672)	29.3 (1388)	28.6 (1124)	28.7 (3487)
High	41.9 (2459)	42.1 (1997)	40.8 (1602)	41.7 (5068)
Not stated	6.1 (358)	4.9 (233)	5.4 (213)	5.7 (696)
Perceived addiction to cigarettes				
Not at all	10.7 (630)	13.1 (619)	14.6 (573)	12.5 (1523)
Yes – somewhat addicted	41.4 (2432)	39.9 (1893)	40.6 (1595)	41.0 (4981)
Yes – very addicted	46.3 (2718)	45.4 (2150)	43.5 (1708)	44.9 (5454)
Not stated	1.6 (92)	1.6 (78)	1.3 (52)	1.6 (198)
Frequency of cigarette smoking				
Current Daily Smoker	69.2 (4062)	62.6 (2964)	62.9 (2471)	66.6 (8101)
Current Weekly Smoker	9.8 (576)	9.7 (462)	12.8 (505)	10.9 (1326)
Current Monthly Smoker	3.2 (189)	3.7 (174)	4.7 (186)	3.5 (430)
Current Less-than-monthly Smoker	6.9 (406)	1.9 (91)	2.2 (89)	4.5 (548)
Recent Quitter	10.9 (638)	22.2 (1050)	17.3 (678)	14.4 (1750)

* This table shows sociodemographic characteristics by the number of observations in each Wave (n=14,536) and total observations for unique respondents (n=12, 155)

4.0 RESULTS

4.1 Sample characteristics

Table 2 presents the weighted sample profile of people with an attempt to quit smoking in the past 12-months prior to the survey date, who were included in the current analysis (n=12,155). Across all countries, a majority of respondents were male (53.9%), current daily smokers (66.6%), and reported feeling ‘somewhat addicted’ (41.0%) or ‘very addicted’ (44.9%) to cigarettes.

4.2 Use of cessation assistance – categories

Table 3 presents the use of each cessation assistance category across all countries and survey waves. Across all countries, among individuals with an attempt to quit smoking in the past 12-months prior to survey date, e-cigarettes (29.9%) and nicotine replacement therapies (NRT; 29.8%) were the most commonly reported categories of cessation assistance, followed by self-help services (17.8%), and prescription pharmacological therapies (PPT; 12.6%). Stratified country results on the use of cessation assistance are included in Figure 1 and in the appendix, Tables A2-5. The following section summarizes the findings from generalized estimating equation (GEE) models examining changes in the use of cessation assistance categories within each country over time.

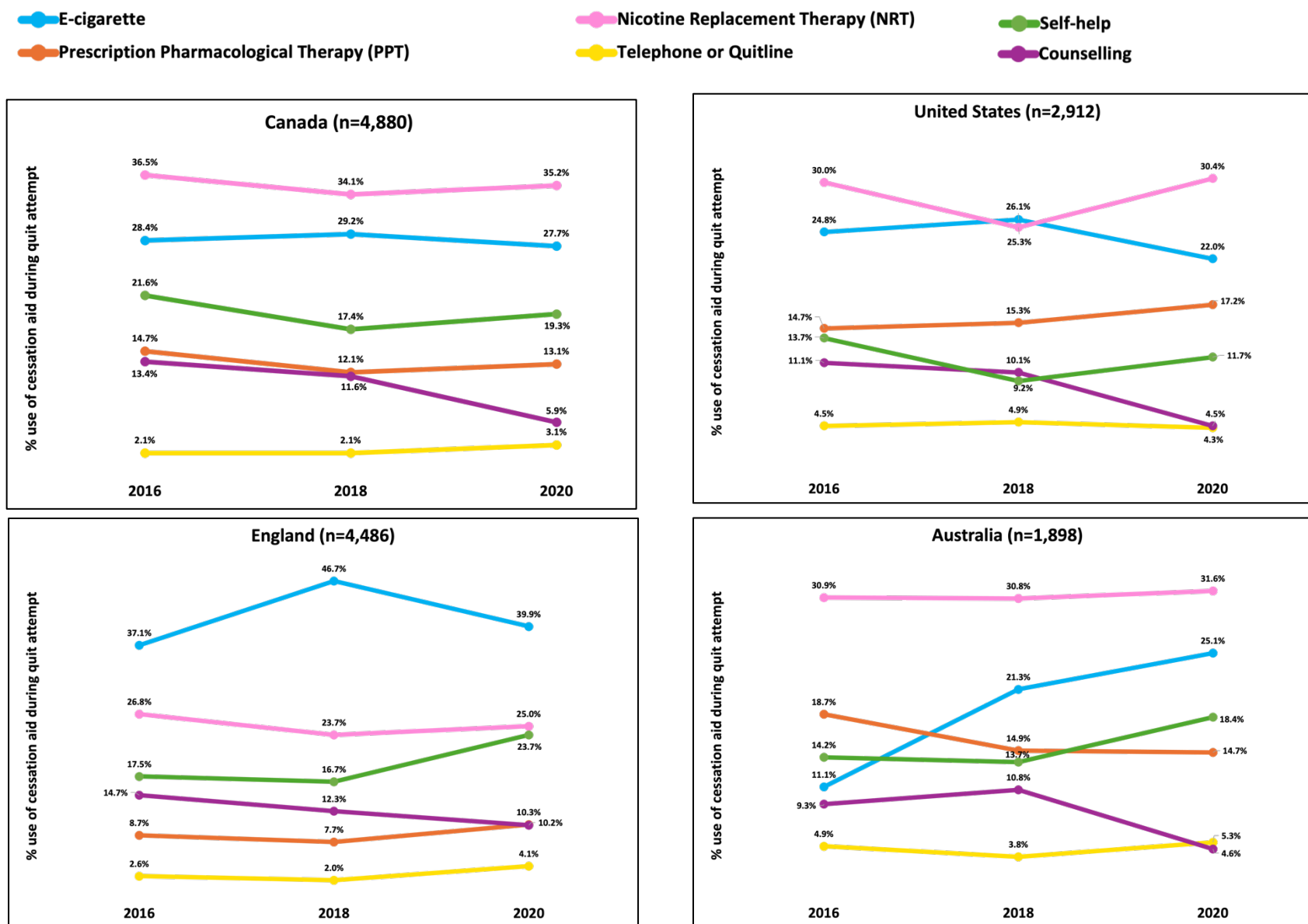
Table 3. Any use of cessation assistance among people with an attempt to quit smoking in the past 12-months months in Canada, the United States, England, and Australia from 2016 – 2020. *

	2016 (n = 5,870)	2018 (n = 4,739)	2020 (n = 3,927)	Total (n=12,155)
	% (n)	% (n)	% (n)	% (n)
E-cigarette	28.1 (1648)	33.3 (1577)	30.1 (1183)	29.9 (3638)
Nicotine Replacement Therapy (NRT)	31.0 (1823)	28.4 (1344)	30.4 (1197)	29.8 (3624)
Nicotine Patch	19.1 (1119)	16.5 (783)	17.1 (672)	17.7 (2150)
Nicotine gum	13.7 (802)	12.3 (584)	14.0 (548)	13.4 (1625)
Nicotine lozenges.	4.9 (289)	5.5 (263)	5.7 (226)	5.2 (637)
Nicotine mouth spray.	3.3 (196)	3.3 (156)	4.2 (163)	3.6 (437)
UK: Nicotine inhaler/ inhalator, e.g. Voke	3.2 (187)	2.7 (129)	2.7 (105)	2.9 (357)
Otherwise: Nicotine inhaler/ inhalator				
Nicotine sublingual tablets.	0.5 (31)	0.4 (18)	0.7 (27)	0.6 (68)
Nicotine dissolvable oral strips.	0.7 (41)	0.4 (21)	0.2 (10)	0.6 (69)
Nicotine nasal spray.	0.4 (24)	0.5 (25)	0.4 (16)	0.5 (56)
Other nicotine product.	0.4 (25)	0.4 (21)	1.6 (64)	0.8 (94)
Prescription pharmacological therapy (PPT)	13.2 (777)	11.7 (553)	13.2 (520)	12.6 (1530)
Varenicline or Chantix or Champix.	10.6 (623)	8.7 (414)	10.1 (397)	9.8 (1189)
Bupropion or Zyban or Wellbutrin.	3.8 (256)	3.1 (147)	3.2 (127)	3.4 (418)
Cytisine [Cravv]	n/a	0.5 (23)	1.1 (41)	0.9 (57)
Telephone or Quitline	3.2 (186)	2.9 (138)	4.0 (156)	3.5 (421)

	2016 (n = 5,870)	2018 (n = 4,739)	2020 (n = 3,927)	Total (n=12,155)
	% (n)	% (n)	% (n)	% (n)
Counselling	12.8 (750)	11.4 (540)	6.8 (267)	11.3 (1377)
Counselling/clinic/program	4.6 (270)	4.1 (195)	4.0 (157)	4.6 (557)
A smoking cessation session offered by your doctor's office	10.1 (591)	8.6 (407)	3.6 (140)	8.3 (1012)
Self-help	17.5 (1028)	14.9 (708)	19.1 (752)	17.8 (2163)
Apps or automated services on a mobile phone or tablet.	4.4 (255)	4.5 (212)	5.8 (228)	5.0 (612)
The internet -- i.e. a website about quitting smoking.	11.1 (650)	9.3 (442)	12.2 (477)	11.3 (1371)
Pamphlets or brochures on how to quit.	7.2 (428)	5.4 (255)	7.0 (276)	6.8 (825)
Other / No aid	50.7 (2978)	51.8 (2457)	52.6 (2064)	51.8 (6299)
Smokeless tobacco -- i.e. snus, chew, or dip.	2.3 (133)	1.8 (85)	1.5 (58)	2.0 (244)
A heated tobacco product.	n/a	1.3 (64)	1.6 (62)	1.6 (96)
Other (specify).	5.4 (318)	3.9 (185)	5.5 (214)	5.0 (599)
None of above	43.4 (2545)	45.1 (2137)	44.4 (1743)	44.4 (5397)

*Categories are not mutually exclusive.

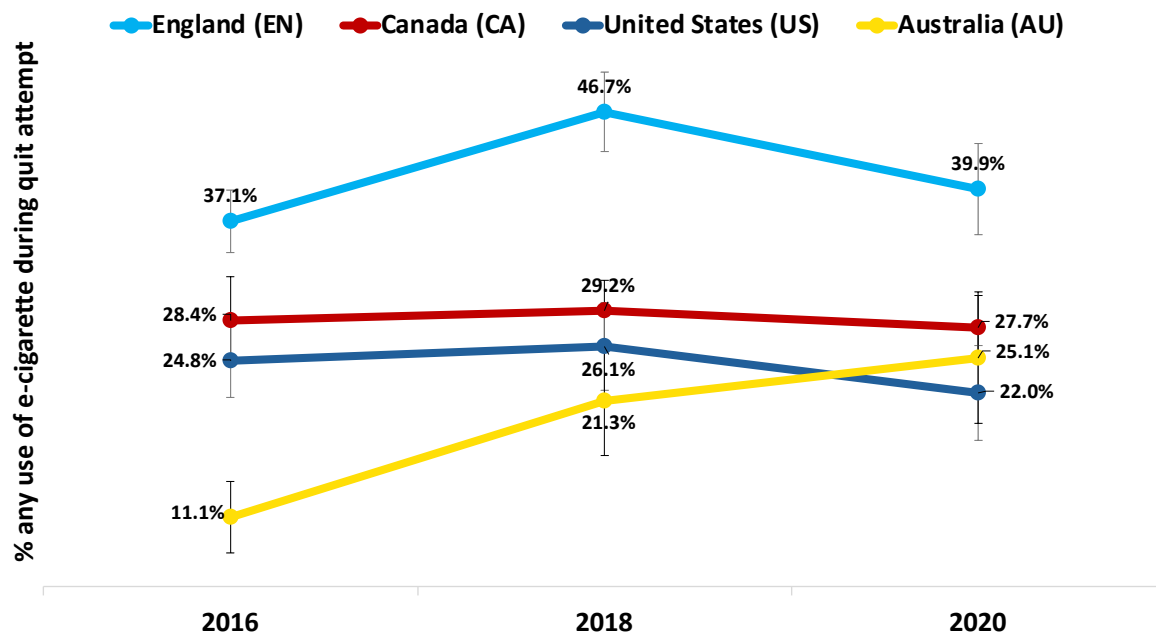
Figure 1. Any use of cessation assistance category among people with an attempt to quit smoking in the past 12-months in Canada, the United States, England, and Australia, 2016-2020



4.2.1 Any use of e-cigarettes

Figure 2 shows the prevalence of e-cigarettes used during an attempt to quit smoking in the past 12-months across all countries and survey years. Stratified country regression models are included in the Appendix and described below.

Figure 2. Any use of e-cigarettes among people with an attempt to quit smoking in the past 12-months.



England—As Figure 2 shows, 37.1% of respondents reported using e-cigarettes during a quit attempt in 2016, which increased to 46.7% in 2018 (OR= 1.40, 95% CI=1.13–1.73, $p=0.002$), and decreased to 39.9% in 2020 vs. 2018 (OR=0.76, 95% CI=0.58–0.98, $p=0.032$; see Table A6). Compared to respondents with ‘low’ education (41%), people with ‘high’ education were less likely to use e-cigarettes during a quit attempt (35.8%; OR=0.64, 95% CI=0.51–0.80, $p<.001$). Respondents were more likely to use e-cigarettes during a quit attempt if they perceived feeling ‘somewhat addicted’ (37.8%; OR=1.39, 95% CI=1.08–1.78, $p=0.009$) or ‘very addicted’ to cigarettes (48.9%; OR=2.07, 95% CI=1.60–2.68, $p<.001$) compared to those who felt ‘not at all’ addicted to cigarettes (29.7%). Respondents present in all three survey waves were more likely (48.1%; OR=1.50, 95% CI=1.04–2.17, $p=0.030$) to use an e-cigarette during a quit attempt compared to those present in only one wave (39.6%). No differences were observed by age group, sex-at-birth, ethnicity, or income.

Canada – As Figure 2 shows, 28.4% of respondents reported using e-cigarettes during a quit attempt in 2016, which had a non-significant increase to 29.2% in 2018 (OR= 0.96, 95% CI=0.78–1.17, $p=0.662$), and a non-significant decrease to 27.7% in 2020 vs. 2018 (OR=0.90, 95% CI=0.73–1.11, $p=0.319$; see Table A7). Respondents in higher age groups were less likely to use an e-cigarette during a quit attempt compared to those in the lowest group, aged 18–24 (39.8%; $p<0.05$ for all contrasts). Use of an e-cigarette during a quit attempt was more likely among respondents who felt ‘very addicted’ to cigarettes (28.1%; OR=1.30, 95% CI=0.99–1.71,

p=0.056) compared to those who felt 'not at all' addicted to cigarettes (27.4%). Respondents present in two survey waves were more likely (29.5%; OR=1.27, 95% CI=1.03–1.57, p=0.025) to use an e-cigarette during a quit attempt when compared to those present in one wave (27.9%). No differences were observed by sex-at-birth, ethnicity, education, or income.

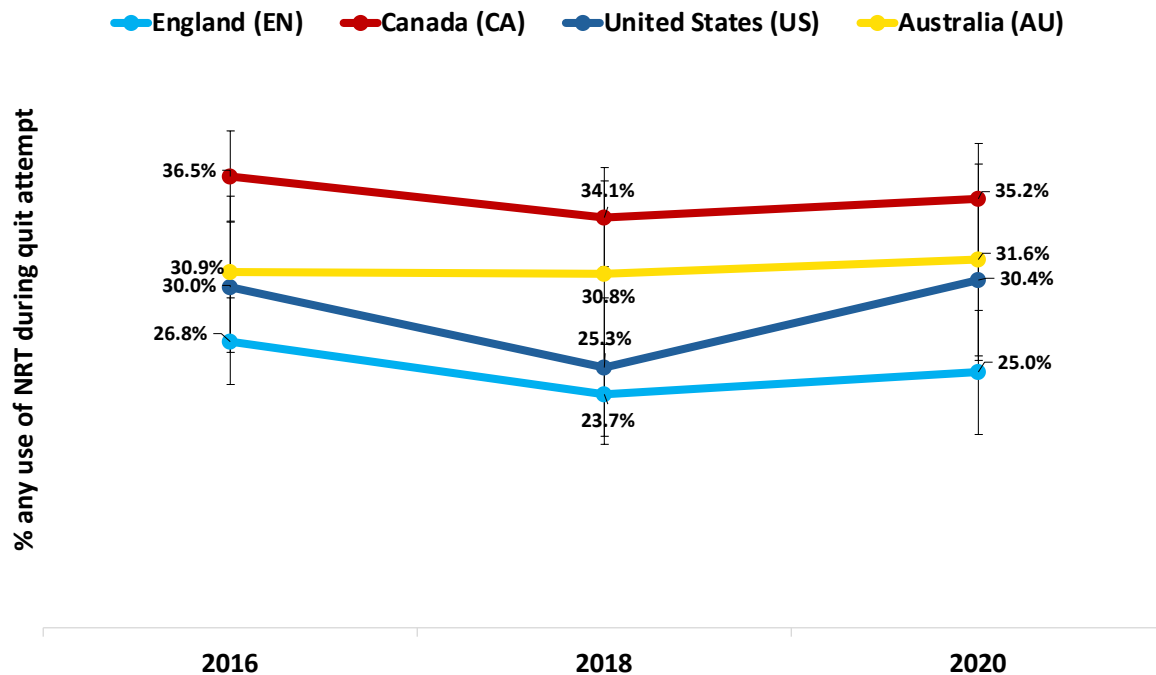
United States – As Figure 2 shows, 24.8% of respondents reported using e-cigarettes during a quit attempt in 2016, with a non-significant increase to 26.1% in 2018 (OR= 0.95, 95% CI=0.72-1.25, p=0.703), and a non-significant decrease to 22.0% in 2020 vs. 2018 (OR= 0.84, 95% CI=0.61-1.16, p=0.294; see Table A8). Respondents in higher age groups were less likely to use an e-cigarette during an attempt to quit smoking, when compared to those in the lowest group, aged 18–24 (36.5%; p<.001 for all contrasts). 'White' respondents (26.1%) were more likely to report using an e-cigarette during a quit attempt when compared to 'non-white' respondents (20.3%; OR=1.40, 95% CI=1.05-1.86, p=0.021). Using e-cigarettes during a quit attempt was more likely among people with higher levels of education (28.1%), when compared to those with 'low' education (21.3%; p≤0.042 for all contrasts). Respondents with 'moderate' income were more likely to use an e-cigarette during a quit attempt (27.7%; OR=1.43, 95% CI=1.04-1.96, p=0.026) when compared to those with 'low' income (20.7%). No differences were observed by sex-at-birth, perceived addiction to cigarettes, or time in sample.

Australia – As Figure 2 shows, 11.1% of respondents reported using e-cigarettes during a quit attempt in 2016, which increased to 21.3% in 2018 (OR= 2.19, 95% CI=1.35-3.56, p=0.002), and had a non-significant increase to 25.1% in 2020 vs. 2018 (OR= 1.05, 95% CI=0.65-1.68, p=0.855; see Table A9). Respondents in age group '55 and up' were less likely (11.8%; OR= 0.38, 95% CI=0.17-0.85, p=0.018) to use an e-cigarette during an attempt to quit smoking, when compared to those in the lowest group, aged 18–24 (21.8%). Compared to those who felt 'not at all' addicted to cigarettes (29.1%), respondents were less likely to use e-cigarettes during a quit attempt if they perceived feeling 'somewhat addicted' to cigarettes (14.2%; OR=0.46, 95% CI=0.25-0.84, p=0.012). Respondents present in three survey waves were more likely to use an e-cigarette during a quit attempt (33.5%; OR=2.08, 95% CI=1.11-3.90, p=0.022) compared to those present in one wave (15.2%). No differences were observed by sex-at-birth, ethnicity, education, or income.

4.2.2 Any use of nicotine replacement therapy (NRT)

Figure 3 shows the prevalence of nicotine replacement therapy (NRT) used during an attempt to quit smoking in the past 12-months across all countries and survey years. Stratified country regression models are included in the Appendix and described below.

Figure 3. Any use of nicotine replacement therapy (NRT) among people with an attempt to quit smoking in the past 12-months.



England— As Figure 3 shows, 26.8% of respondents reported using nicotine replacement therapy (NRT) during a quit attempt in 2016, which had a non-significant decrease to 23.7% in 2018 (OR=0.85, 95% CI=0.67-1.07, p=0.168), and a non-significant increase to 25.0% in 2020 vs. 2018 (OR=1.21, 95% CI=0.92-1.60, p=0.176; see table A10). Respondents in age groups '40–54' were more likely to use NRT during a quit attempt (29.9%; OR= 1.32, 95% CI=1.00-1.74, p=0.049), when compared to those in the lowest group, aged 18–24 (21.6%). Respondents were more likely to use NRT during a quit attempt if they perceived feeling 'somewhat addicted' (22.9%; OR=1.70, 95% CI=1.25 - 2.31, p=0.001) or 'very addicted' to cigarettes (33.0%; OR=2.88, 95% CI=2.10-3.94, p<.001) compared to those who felt 'not at all' addicted to cigarettes (13.3%). No differences were observed by sex-at-birth, ethnicity, education, income, or time in sample.

Canada – As Figure 3 shows, 36.5% of respondents reported using NRT during a quit attempt in 2016, which had a non-significant decrease to 34.1% in 2018 (OR=0.95, 95% CI=0.78-1.16, p=0.599), followed by a non-significant increase to 35.2% in 2020 vs. 2018 (OR=1.05, 95% CI=0.85-1.29, p=0.668; see Table A11). Respondents were more likely to use NRT during a quit attempt in age groups '40–54' (38.2%; OR= 1.27, 95 % CI=1.02-1.58, p=0.030) and '55 and up'

(OR= 1.37, 95% CI=1.08-1.73, p=0.008), compared to those in the lowest group, aged 18–24 (28.9%). ‘White’ respondents (35.8%; OR= 0.81, 95% CI=0.65-1.01, p=0.059) and those who did not state their ethnicity (19.7%; OR= 0.32, 95% CI=0.16-0.64, p=0.001) were less likely to use NRT during an attempt to quit smoking, when compared to ‘non-white’ respondents (34.9%). Respondents were more likely to use NRT during a quit attempt if they perceived feeling ‘somewhat addicted’ (29.6%; OR= 2.10, 95% CI=1.56-2.82, p<.001) or ‘very addicted’ to cigarettes (45.6%; OR= 3.77, 95% CI=2.77-5.13, p<.001) compared to those who felt ‘not at all’ addicted to cigarettes (15.7%). No differences were observed by sex-at-birth, education, income, or time in sample.

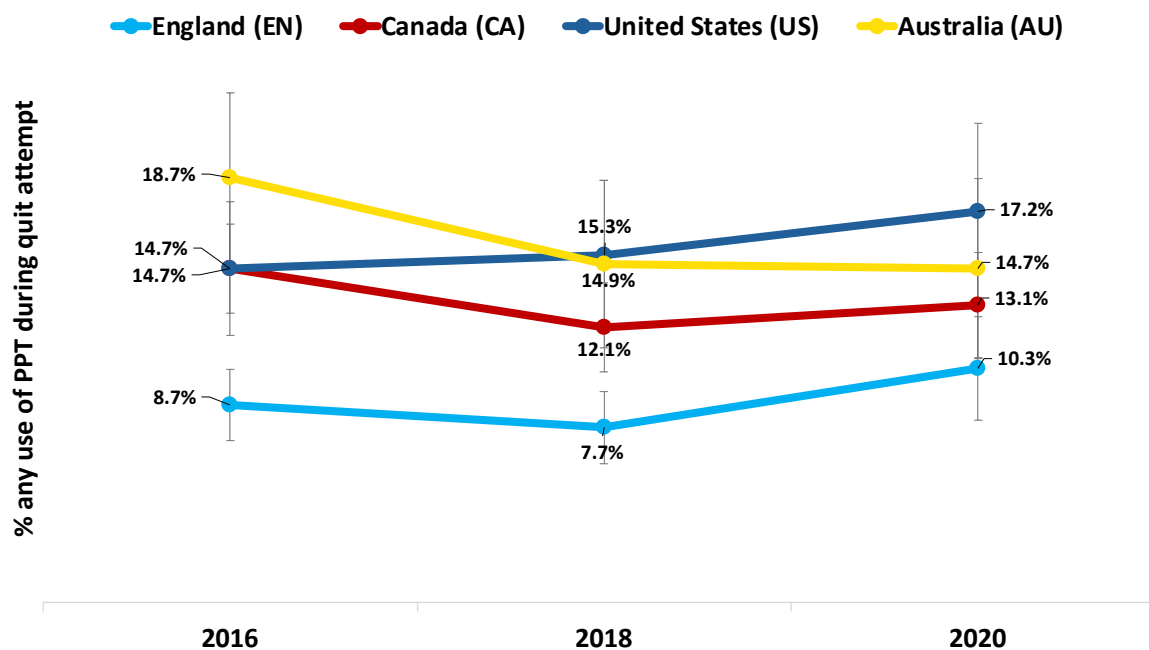
United States – As Figure 3 shows, 30.0% of respondents reported using NRT during a quit attempt in 2016, which had a non-significant decrease to 25.3% in 2018 (OR= 0.86, 95% CI=0.63-1.17, p=0.327), and a non-significant increase to 30.4% in 2020 vs. 2018 (OR= 1.31, 95% CI=0.93-1.84, p=0.117; see Table A12). Respondents were more likely to use NRT during a quit attempt in age groups ‘40–54’ (33.2%; OR= 1.59, 95% CI=1.13-2.24, p=0.008) and ‘55 and up’ (32.5%; OR= 1.42, 95% CI=1.04-1.94, p=0.028), compared to those in the lowest group, aged 18–24 (21.5%; see table 10). When compared to respondents with ‘low’ education (27.1%), people with ‘high’ education were more likely to use NRT during a quit attempt (31.9%; OR=1.43, 95% CI=1.01-2.02, p=0.046). Respondents with higher levels of perceived addiction to cigarettes were more likely to use NRT during an attempt to quit smoking, compared to those who felt ‘not at all’ addicted to cigarettes (13.0%; p≤0.001 for all contrasts). Those who did not state their level of perceived addiction to cigarettes were also more likely to use NRT during a quit attempt (30.9%; OR=3.14, 95% CI=1.37-7.21, p=0.007). No differences were observed by sex-at-birth, ethnicity, income, or time in sample.

Australia – As Figure 3 shows, 30.9% of respondents reported using NRT during a quit attempt in 2016, which remained unchanged in 2018 (30.8%; OR=1.19, 95% CI=0.82-1.72, p=0.361), and had a non-significant increase to 31.6% in 2020 vs. 2018 (OR=1.16, 95% CI=0.78-1.70, p=0.464; see Table A13). Respondents were more likely to use NRT during a quit attempt in age groups ‘40–54’ (40.8%; OR=2.40, 95% CI=1.13-5.10, p=0.023) and ‘55 and up’ (35.1%; OR= 2.12, 95% CI=0.98-4.57, p=0.057), when compared to those in the lowest group, aged 18–24 (19.3%; see table 11). Respondents with higher levels of perceived addiction to cigarettes were more likely to use NRT during an attempt to quit smoking, compared to those who felt ‘not at all’ addicted to cigarettes (11.6%; p≤0.008 for all contrasts). Those who did not state their level of perceived addiction to cigarettes were less likely to use NRT during a quit attempt (0.2%; OR=0.02, 95% CI=0.01-0.13, p<.001). Respondents present in three survey waves were less likely to use NRT during a quit attempt (23.9%; OR=0.51, 95% CI=0.31-0.85, p=0.010) when compared to those present in one wave (33.3%). No differences were observed by sex-at-birth, ethnicity, education, or income.

4.2.3 Any use of prescription pharmacological therapy (PPT)

Figure 4 shows the prevalence of prescription pharmacological therapy used during an attempt to quit smoking in the past 12-months across all countries and survey years. Stratified country regression models are included in the Appendix and described below.

Figure 4. Any use of prescription pharmacological therapy among people with an attempt to quit smoking in the past 12-months.



England— As Figure 4 shows, 8.7% of respondents reported using prescription pharmacological therapy (PPT) during a quit attempt in 2016, which had a non-significant decrease to 7.7% in 2018 (OR=1.00, 95% CI=0.75-1.34, $p=0.997$) and increased to 10.3% in 2020 vs. 2018 (OR= 1.60, 95% CI=1.16-2.21, $p=0.004$). Respondents in older age groups were more likely to use PPT during a quit attempt when compared to those in the lowest group, aged 18–24 (5.7%; $p\leq 0.049$ for all contrasts). Respondents with higher levels of perceived addiction to cigarettes were more likely to use PPT during an attempt to quit smoking, compared to those who felt ‘not at all’ addicted to cigarettes (3.3%; $p\leq 0.001$ for all contrasts excluding ‘not stated’). Use of PPT during a quit attempt was less likely among respondents present in two (6.4%; OR= 0.62, 95% CI=0.41-0.92, $p=0.017$) or three (6.0%; OR= 0.38, 95% CI=0.17-0.82, $p=0.014$) survey waves, when compared to those present in one wave (9.4%). No differences were observed by sex-at-birth, ethnicity, education, or income.

Canada – As Figure 4 shows, 14.7% of respondents reported using PPT during a quit attempt in 2016, which had a non-significant decrease to 12.2% in 2018 (OR=0.83, 95% CI=0.65-1.07, $p=0.157$) and non-significant increase to 13.1% in 2020 vs. 2018 (OR=1.02, 95% CI=0.79-1.33, $p=0.862$). Respondents in older age groups were more likely to use PPT during a quit attempt when compared to those in the lowest group, aged 18–24 (5.5%; $p\leq 0.001$ for all contrasts). Respondents were more likely to use PPT during a quit attempt if they reported feeling ‘very addicted’ (18.3%; OR=3.33, 95% CI=2.00-5.56, $p<.001$) to cigarettes, compared to those who felt ‘not at all’ addicted to cigarettes (5.3%). No differences were observed by sex-at-birth, ethnicity, education, income, or time in sample.

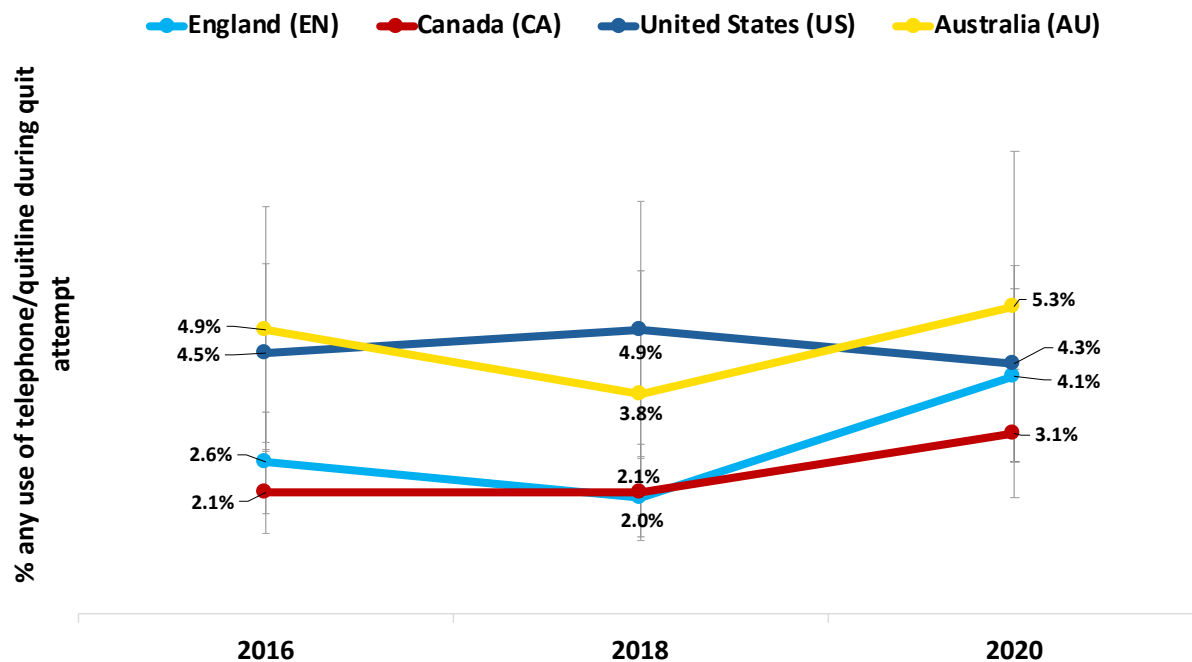
United States – As Figure 4 shows, 14.7% of respondents reported using PPT during a quit attempt in 2016, which had a non-significant increase to 15.3% in 2018 (OR=0.96, 95% CI=0.67-1.37, p=0.807) and another non-significant increase to 17.2% in 2020 vs. 2018 (OR=1.13, 95% CI=0.79-1.63, p=0.496). Respondents were more likely to use PPT during a quit attempt in age groups '40–54' (17.4%; OR= 1.95, 95% CI=1.19-3.18, p=0.008) and '55 and up' (20.3%; OR= 2.31, 95% CI=1.49-3.60, p<.001), when compared to those in the lowest group, aged 18–24 (8.0%). Respondents were more likely to use PPT during a quit attempt if they reported feeling 'somewhat addicted' (14.1%; OR= 2.09, 95% CI=1.26-3.46, p=0.004) or 'very addicted' (19.6%; OR= 3.09, 95% CI=1.85-5.16, p<.001) to cigarettes, compared to those who felt 'not at all' addicted to cigarettes (6.8%). Respondents present in two survey waves were more likely to use PPT during a quit attempt (18.9%; OR=1.52, 95% CI=1.06-2.119, p=0.023) when compared to those present in only one wave (14.2%). No differences were observed by sex-at-birth, ethnicity, education, or income.

Australia – As Figure 4 shows, 18.7% of respondents reported using PPT during a quit attempt in 2016, which had a non-significant decrease to 14.9% in 2018 (OR=0.69, 95% CI=0.43-1.11, p=0.122) and had a non-significant decrease to 14.7% in 2020 vs. 2018 (OR= 1.23, 95% CI=0.75-2.03, p=0.417). Respondents '55 and up' were more likely to use PPT during a quit attempt (21.2%; OR=3.22, 95% CI=1.03-10.08, p=0.045) when compared to those in the lowest group, aged 18–24 (6.9%). Respondents were more likely to use PPT during a quit attempt if they reported feeling 'very addicted' to cigarettes (21.0%; OR= 3.56, 95% CI=1.31-9.65, p=0.013), compared to those who felt 'not at all' addicted to cigarettes (6.8%). No differences were observed by sex-at-birth, ethnicity, education, income, or time in sample.

4.2.4 Any use of telephone or quitline services

Figure 5 shows the prevalence of telephone/quitline services used during an attempt to quit smoking in the past 12-months across all countries and survey years. Stratified country regression models are included in the Appendix and described below.

Figure 5. Any use of telephone/quitline services among people with an attempt to quit smoking in the past 12-months.



England— As Figure 5 shows, 2.6% of respondents reported using telephone or quitline services during a quit attempt in 2016, which had a non-significant decrease to 2.0% in 2018 (OR= 0.92, 95% CI=0.55-1.54, $p=0.744$) and increased to 4.1% in 2020 vs. 2018 (OR= 1.94, 95% CI=1.14-3.30, $p=0.015$; see Table A18). Respondents were less likely to use telephone or quitline services during a quit attempt in age groups '40–54' (1.6%; OR= 0.40, 95% CI=0.20-0.78, $p=0.007$) and '55 and up' (1.1%; OR=0.31, 95% CI=0.15-0.63, $p=0.001$), when compared to those in the lowest group, aged 18–24 (4.3%). Males were more likely (3.7%; OR=1.78, 95% CI=1.13-2.79, $p=0.013$) to use telephone or quitline services during a quit attempt when compared to female respondents (1.8%). Those who had 'high' levels of education were more likely (4.9%; OR=2.29, 95% CI=1.19-4.39, $p=0.013$) to use telephone or quitline services during a quit attempt when compared to respondents with 'low' education (1.4%). Respondents who reported higher than 'low' levels of income were more likely to use telephone or quitline services during a quit attempt compared to those with 'low' income (1.4%; $p\leq 0.004$ for all contrasts, excluding 'not stated'). Respondents present in two survey waves were less likely (0.8%; OR=0.35, 95% CI=0.16-0.76, $p=0.008$) to use telephone or quitline services during an attempt to quit smoking, compared to those present in one wave (3.3%). No differences were observed by ethnicity or perceived addiction to cigarettes.

Canada – As Figure 5 shows, 2.1% of respondents reported using telephone or quitline services during a quit attempt in 2016, with no significant change in 2018 (2.1%; OR=1.12, 95% CI=0.59-2.13, $p=0.725$) and a non-significant increase to 3.1% in 2020 vs. 2018 (OR=1.64, 95% CI=0.87-3.06, $p=0.125$). No differences were observed by age group, sex-at-birth, ethnicity, education, income, perceived addiction to cigarettes, or time in sample (see Table A19).

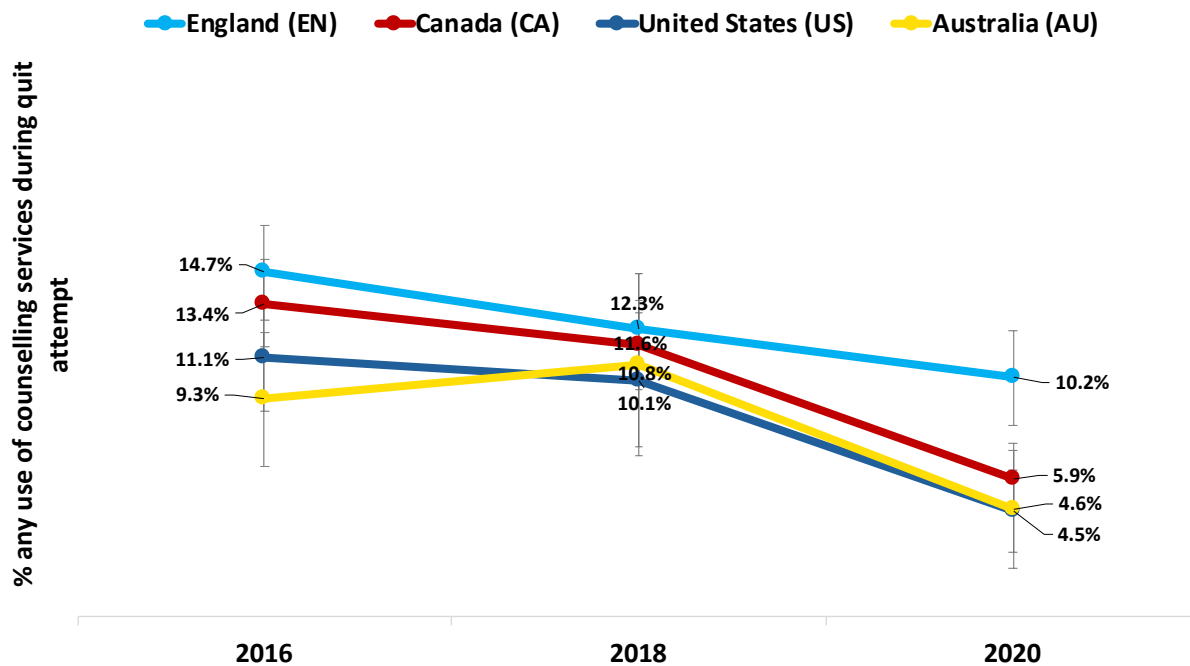
United States – As Figure 5 shows, 4.5% of respondents reported using telephone or quitline services during a quit attempt in 2016, which had a non-significant increase to 4.9% in 2018 (OR=0.79, 95% CI=0.44-1.41, p=0.419) and non-significant decrease to 4.2% in 2020 vs. 2018 (OR=0.91, 95% CI=0.47-1.79, p=0.791; see Table A20). ‘White’ respondents were less likely (3.6%; OR=0.40, 95% CI=0.23-0.68, p=.001) to use telephone or quitline services during a quit attempt compared to ‘non-white’ respondents (7.4%). Respondents were more likely to use counselling services during a quit attempt if they felt ‘somewhat addicted’ (3.9%; OR=2.36, 95% CI=1.04-5.40, p=0.041), ‘very addicted’ (5.5%; OR=3.58, 95% CI=1.56-8.21, p=0.003) to cigarettes, or did not state their perceived level of addiction to cigarettes (15.3%; OR=12.66, 95% CI=2.69-59.55, p=.001) compared to those who felt ‘not at all’ addicted to cigarettes (2.0%). No differences were observed by age group, sex-at-birth, education, income, or time in sample.

Australia – As Figure 5 shows, 4.9% of respondents reported using telephone or quitline services during a quit attempt in 2016, which had a non-significant decrease to 3.8% in 2018 (OR=0.98, 95% CI=0.39-2.43, p=0.960) and non-significant increase to 5.3% in 2020 vs. 2018 (OR=1.63, 95% CI=0.66-4.08, p=0.293; see Table A21). When compared to those with ‘low’ income (4.8%), respondents who did not state their level of income were less likely (0.3%; OR=0.05, 95% CI=0.01-0.51, p=0.001) to use telephone or quitline services during an attempt to quit smoking. Respondents present in three survey waves were less likely (1.8%; OR=0.22, 95% CI=0.07-0.71, p=0.011) to use telephone or quitline services during an attempt to quit smoking, compared to those present in one wave (5.5%). No differences were observed by age group, sex-at-birth, ethnicity, education, or perceived addiction to cigarettes.

4.2.5 Any use of counselling services

Figure 6 shows the prevalence of counselling services used during an attempt to quit smoking in the past 12-months across all countries and survey years. Stratified country regression models are included in the Appendix and described below.

Figure 6. Any use of counselling services among people with an attempt to quit smoking in the past 12-months.



England— As Figure 6 shows, 14.7% of respondents reported using counselling services during a quit attempt in 2016, which had a non-significant decrease to 12.3% in 2018 (OR=0.99, 95% CI=0.74-1.34, p=0.965) and to 10.2% in 2020 vs. 2018 (OR=0.77, 95% CI=0.55-1.09, p=0.139). ‘White’ respondents were less likely (12.3%; OR=0.64, 95% CI=0.44-0.94, p=0.023) to use counselling services during a quit attempt compared to ‘non-white’ respondents (16.3%). Respondents were more likely to use counselling services during a quit attempt if they felt ‘somewhat addicted’ (12.1%; OR=1.66, 95% CI=1.11-2.50, p=0.015) or ‘very addicted’ (15.5%; OR=2.23, 95% CI=1.47-3.38, p<.001) to cigarettes, compared to those who felt ‘not at all’ addicted to cigarettes (7.2%). Respondents present in two survey waves were less likely (7.3%; OR=0.50, 95% CI=0.34-0.75, p=0.001) to use counselling services during a quit attempt compared to those present in only one wave (14.1%). No differences were observed by age group, sex-at-birth, education, or income.

Canada – As Figure 6 shows, 13.4% of respondents reported using counselling services during a quit attempt in 2016, which had a non-significant decrease to 11.6% in 2018 (OR=0.90, 95% CI=0.68-1.19, p=0.456) and decreased to 5.9% in 2020 vs. 2018 (OR=0.46, 95% CI=0.33-0.65, p<.001). Use of counselling services during a quit attempt was less likely among ‘white’ respondents (9.6%; OR=0.60, 95% CI=0.45-0.79, p<.001) compared to ‘non-white’ respondents

(15.7%), and among those who reported 'high' income (8.5%; OR=0.60, 95% CI=0.44-0.84, $p=0.002$) compared to those with 'low' income (11.6%). Respondents with 'high' education were more likely (13.2%; OR=1.77, 95% CI=1.25-2.49, $p=0.001$) to use counselling services during a quit attempt when compared to respondents with 'low' education (8.9%). Those who did not state a perceived level of addiction to cigarettes were more likely (29.4%; OR=3.92, 95% CI=1.69-9.11, $p=0.002$) to use counselling services during an attempt to quit smoking, compared to those who felt 'not at all' addicted to cigarettes (8.4%). No differences were observed by age group, sex-at-birth, or time in sample.

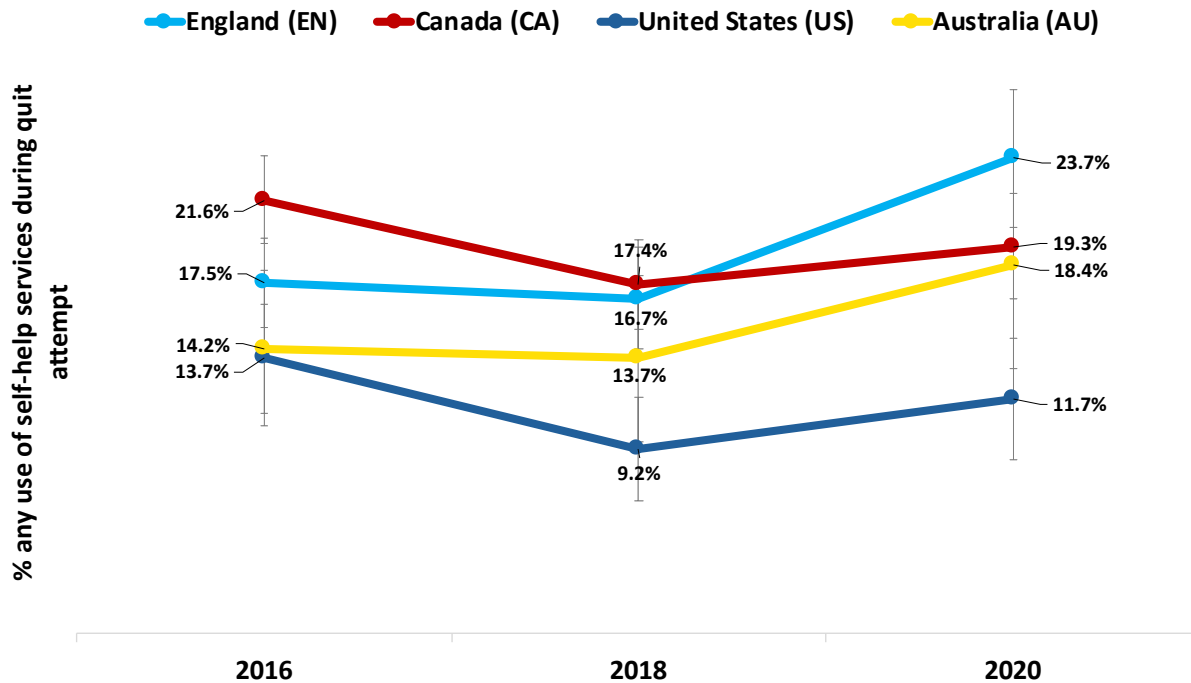
United States – As Figure 6 shows, 11.1% of respondents reported using counselling services during a quit attempt in 2016, which decreased to 10.1% in 2018 (OR=0.67, 95% CI=0.45–1.00, $p=0.049$) and to 4.5% in 2020 vs. 2018 (OR=0.41, 95% CI=0.24 - 0.70, $p=0.001$). Respondents in age group '40-54' were less likely (7.3%; OR=0.57, 95% CI=0.34-0.95, $p=0.032$) to use counselling services during an attempt to quit smoking, compared to those aged '18-24' (10.6%). 'White' respondents were less likely (8.2%; OR=0.53, 95% CI=0.35-0.83, $p=0.005$) to use counselling services during a quit attempt compared to 'non-white' respondents (11.5%). Respondents with higher levels of perceived addiction to cigarettes were more likely to use counselling services during an attempt to quit smoking, when compared to those who felt 'not at all' addicted to cigarettes (5.0%; $p\leq 0.051$ for all contrasts excluding 'not stated'). Respondents present in two survey waves were more likely (10.4%; OR=1.86, 95% CI=1.11-3.10, $p=0.018$) to use counselling services during a quit attempt when compared to those present in one wave (9.2%). No differences were observed by sex-at-birth, education, or income.

Australia – As Figure 6 shows, 9.3% of respondents reported using counselling services during a quit attempt in 2016, which had a non-significant increase to 10.8% in 2018 (OR= 1.32, 95% CI=0.68-2.56, $p=0.405$) and decreased to 4.6% in 2020 vs. 2018 (OR= 0.43, 95% CI=0.18-1.02, $p=0.055$). Those with 'high' levels of education were more likely (13.2%; OR= 2.55, 95% CI=1.41-4.62, $p=0.002$) to use counselling services during a quit attempt when compared to those with 'low' levels of education (6.5%). Respondents were less likely to use counselling services during a quit attempt if they reported higher levels of income compared to those with 'low' income (10.8%; $p\leq 0.056$ for all contrasts). No differences were observed by age group, sex-at-birth, ethnicity, perceived addiction to cigarettes, or time in sample.

4.2.6 Any use of self-help services

Figure 7 shows the prevalence of self-help services used during an attempt to quit smoking in the past 12-months across all countries and survey years. Stratified country regression models are included in the Appendix and described below.

Figure 7. Any use of self-help services among people with an attempt to quit smoking in the past 12-months.



England— As Figure 7 shows, 17.5% of respondents reported using self-help services during a quit attempt in 2016, which had a non-significant decrease to 16.7% in 2018 (OR= 1.07, 95% CI=0.82-1.39, p=0.633) and an increase to 23.7% in 2020 vs. 2018 (OR= 1.55, 95% CI=1.16-2.06, p=0.003). Compared to respondents aged 18–24 (28.9%), respondents in older age groups were less likely to use self-help services during a quit attempt (p<.001 for all contrasts). Male respondents were more likely to use self-help services (20.9%; OR=1.23, 95% CI=1.00-1.52, p=0.056) during an attempt to quit smoking, compared to female respondents (16.6%). Respondents with ‘high’ education were more likely (25.0%; OR= 1.64, 95% CI=1.20-2.24, p=0.002) to use self-help services during a quit attempt compared to those with ‘low’ education (13.3%). Respondents with higher levels of perceived addiction to cigarettes were more likely to use self-help services during an attempt to quit smoking, when compared to those who felt ‘not at all’ addicted to cigarettes (16.5%; p≤0.019 for all contrasts). Use of self-help services were less likely among respondents present in multiple survey waves when compared to those present in only one survey wave (20.7%; p≤0.036 for all contrasts). No differences were observed by ethnicity or income.

Canada – As Figure 7 shows, 21.6% of respondents reported using self-help services during a quit attempt in 2016, which had a non-significant decrease to 17.4% in 2018 (OR= 0.82, 95% CI=0.66-1.03, p=0.087) and a non-significant increase to 19.3% in 2020 vs. 2018 (OR= 1.14, 95% CI=0.90-1.45, p=0.274). Respondents in age groups 25 and up were less likely to use self-help services during an attempt to quit smoking, when compared to those aged '18-24' (29.0%; p<0.001 for all contrasts). Respondents were less likely to use self-help services during a quit attempt if they were male (17.5%; OR= 0.72, 95% CI=0.60-0.86, p<.001) compared to females (22.4%), and if they were 'white' (18.0%; OR= 0.67, 95% CI=0.53-0.85, p=0.001) or did not state their ethnicity (10.8%; OR= 0.34, 95% CI=0.15-0.76, p=0.008) when compared to 'non-white' respondents (28.6%). Those with 'high' education were more likely (23.7%; OR= 1.54, 95% CI=1.18-2.01, p=0.001) to use self-help services during a quit attempt compared to respondents with 'low' education (17.2%). The use self-help services during a quit attempt was also more likely among those who did not state if they felt addicted to cigarettes (37.4%; OR= 2.59, 95% CI=1.21-5.53, p=0.014), compared to those who felt 'not at all' addicted to cigarettes (19.3%). No differences were observed by income or time in sample.

United States – As Figure 7 shows, 13.7% of respondents reported using self-help services during a quit attempt in 2016, which decreased to 9.2% in 2018 (OR=0.70, 95% CI=0.49–1.00, p=0.050) and non-significant increase to 11.7% in 2020 vs. 2018 (OR=1.42, 95% CI=0.92-2.20, p=0.116). Respondents in age groups 25 and up were less likely to use self-help services during an attempt to quit smoking, when compared to those aged '18-24' (24.4%; p<0.001 for all contrasts). 'White' respondents were less likely (10.5%; OR= 0.63, 95% CI=0.44-0.91, p=0.014) to use self-help services during a quit attempt when compared to 'non-white' respondents (15.3%). Respondents with 'high' education were more likely (18.0%; OR= 2.28, 95% CI=1.46-3.54, p<.001) to use self-help services during a quit attempt when compared to those with 'low' education (9.9%). Respondents with higher levels of perceived addiction to cigarettes were more likely to use self-help services during an attempt to quit smoking, when compared to those who felt 'not at all' addicted to cigarettes (8.1%; p≤0.032 for all contrasts). No differences were observed by sex-at-birth, income, or time in sample.

Australia – As Figure 7 shows, 14.2% of respondents reported using self-help services during a quit attempt in 2016, which had a non-significant decrease to 13.7% in 2018 (OR= 1.61, 95% CI=0.95-2.73, p=0.078) and a non-significant increase to 18.4% in 2020 vs. 2018 (OR= 1.25, 95% CI=0.71-2.20, p=0.435). Use of self-help services during a quit attempt was less likely among respondents in age group '55 and up' (9.8%; OR= 0.43, 95% CI=0.21-0.89, p=0.022) compared to those in the lowest group, aged 18–24 (20.7%). Male respondents were less likely (12.6%; OR= 0.60, 95% CI=0.40–0.88, p=0.010) to use self-help services during a quit attempt when compared to female respondents (18.3%). Respondents with 'high' education were more likely (22.6%; OR= 2.11, 95% CI=1.23-3.63, p=0.007) to use self-help services during a quit attempt when compared to those with 'low' education (11.9%). Respondents present in more than one survey wave were less likely to use self-help services during a quit attempt when compared to those present in only one wave (17.8%; p≤0.043 for all contrasts). No differences were observed by ethnicity, income, or perceived addiction to cigarettes.

4.3 Use of effective cessation assistance (excl. e-cigarettes)

Table 4 presents the percentage of respondents who reported using a form of effective cessation assistance other than e-cigarettes across all countries and survey waves. Effective forms of cessation assistance include any use of nicotine replacement products, prescription pharmacological therapies, telephone/quitline services, and counselling services. Across all countries, among individuals with an attempt to quit smoking in the past 12–months prior to survey date, 44.0% of respondents used some form of effective cessation assistance (excluding e-cigarettes). Stratified country results on the use of effective cessation assistance are included in Figure 8. The following section summarizes the findings from generalized estimating equation (GEE) models examining changes in using effective cessation assistance (excluding e-cigarettes) within each country over time.

Table 4. Any use of effective cessation assistance among people with an attempt to quit smoking in the past 12-months months in Canada, the United States, England, and Australia from 2016 – 2020.

	2016 % (n)	2018 % (n)	2020 % (n)
All countries	(n = 5,870)	(n = 4,739)	(n = 3,927)
E-cigarette/Vape	28.1 (1648)	33.3 (1577)	30.1 (1183)
Effective Cessation Assistance (excl. e-cig)	45.9 (2693)	42.7 (2022)	43.4 (1705)
‘Any’ Effective Cessation Assistance (incl. e-cig)	60.0 (3524)	60.1 (2849)	59.4 (2334)
Canada	(n=1,887)	(n=1,572)	(n=1,421)
E-cigarette/Vape	28.4 (536)	29.2 (459)	27.7 (393)
Effective Cessation Assistance (excl. e-cig)	51.6 (974)	48.1 (756)	46.3 (658)
‘Any’ Effective Cessation Assistance (incl. e-cig)	64.0 (1207)	60.4 (950)	58.9 (837)
United States	(n=1,237)	(n=945)	(n=730)
E-cigarette/Vape	24.8 (307)	26.1 (246)	22.0 (161)
Effective Cessation Assistance (excl. e-cig)	45.3 (560)	42.0 (397)	44.3 (323)
‘Any’ Effective Cessation Assistance (incl. e-cig)	57.1 (706)	55.8 (527)	56.8 (415)
England	(n=1,950)	(n=1,644)	(n=1,252)
E-cigarette/Vape	37.1 (723)	46.7 (768)	39.9 (500)
Effective Cessation Assistance (excl. e-cig)	39.9 (777)	35.4 (582)	38.8 (485)
‘Any’ Effective Cessation Assistance (incl. e-cig)	60.8 (1185)	62.7 (1031)	61.2 (767)
Australia	(n=796)	(n=578)	(n=524)
E-cigarette/Vape	11.1 (88)	21.3 (123)	25.1 (132)
Effective Cessation Assistance (excl. e-cig)	48.8 (389)	48.8 (282)	45.7 (240)
‘Any’ Effective Cessation Assistance (incl. e-cig)	54.2 (432)	59.7 (345)	60.0 (314)

Figure 8. Any use of effective cessation assistance category among people with an attempt to quit smoking in the past 12-months in Canada, the United States, England, and Australia, 2016-2020.

● E-cigarette/Vape
 ● Effective Cessation Assistance (excl. e-cigarettes)
 ● 'Any' Effective Cessation Assistance (incl. e-cigarettes)

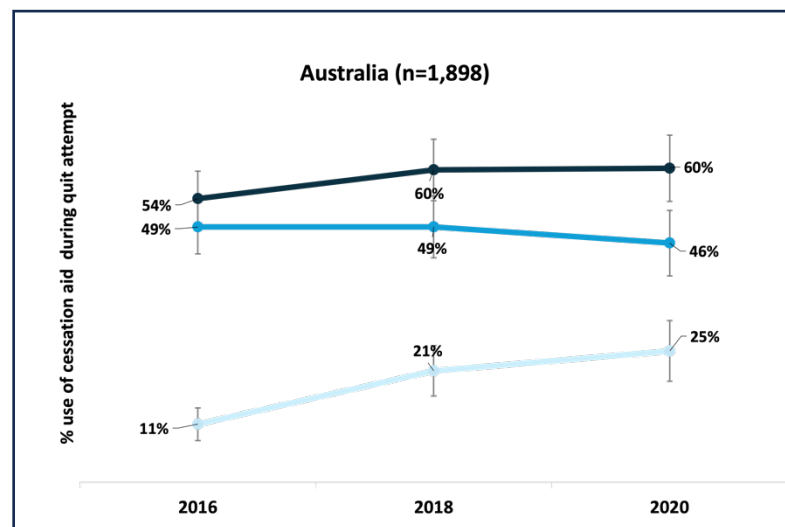
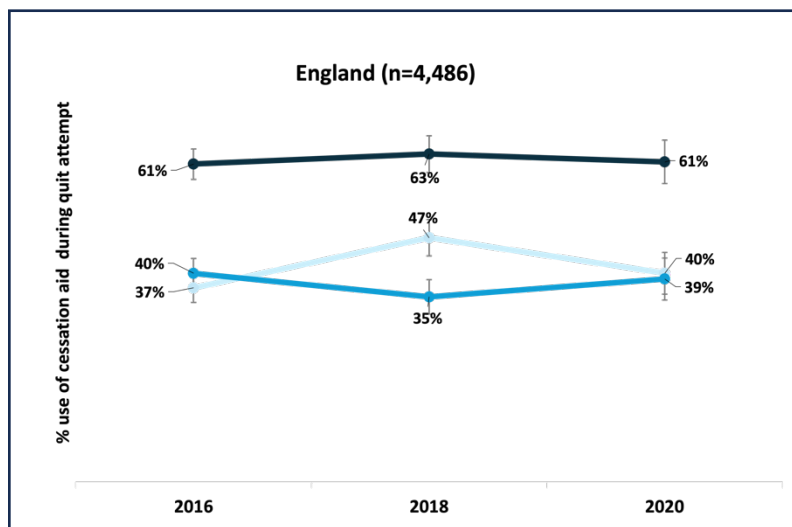
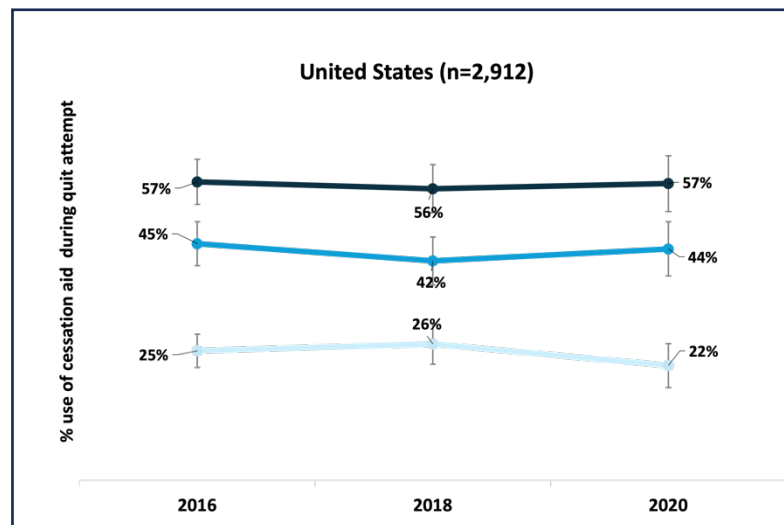
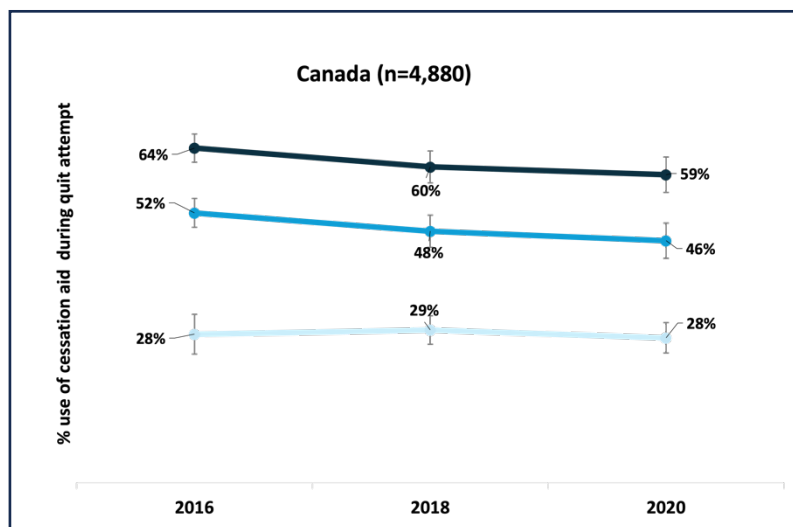
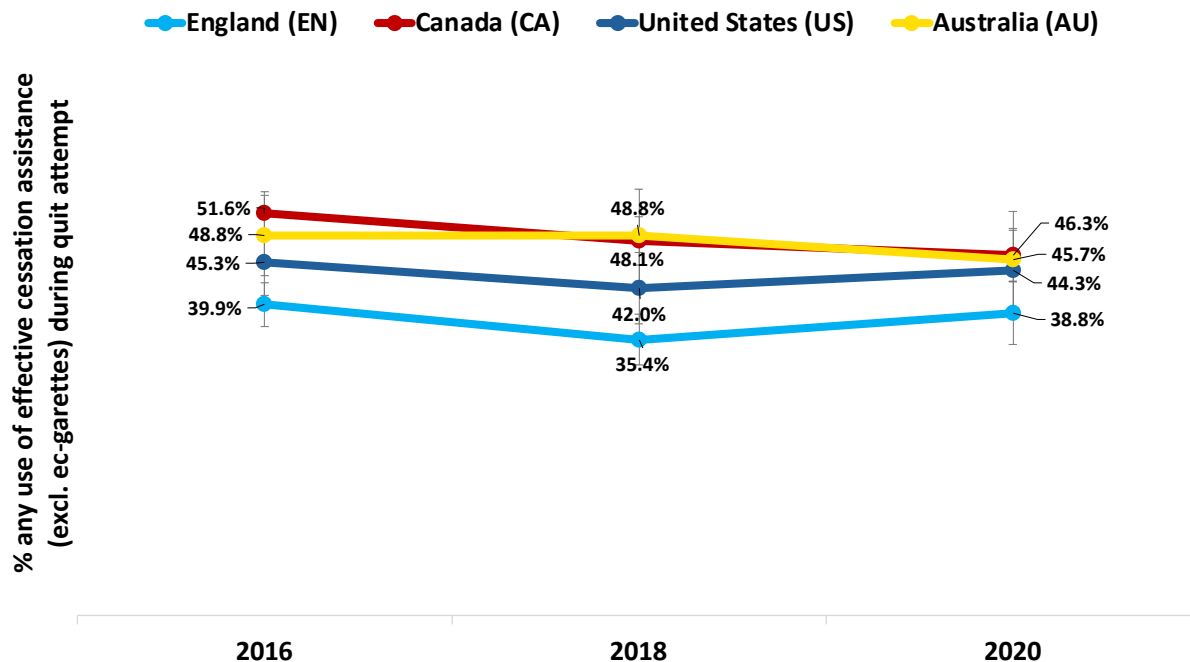


Figure 9 shows the prevalence of effective cessation assistance (excl. e-cigarettes) used during an attempt to quit smoking in the past 12-months across all countries and survey years. Stratified country regression models are included in the Appendix and described below.

Figure 9. Any use of effective cessation assistance (excl. e-cigarettes) among people with an attempt to quit smoking in the past 12-months.



England—As Figure 9 shows, 39.9% of respondents reported using effective cessation assistance (excluding e-cigarettes) during a quit attempt in 2016, which had a non-significant decrease to 35.4% in 2018 (OR=0.92, 95% CI=0.74–1.14, p=0.422), and non-significant increase to 38.8% in 2020 vs. 2018 (OR=1.27, 95% CI=0.98–1.64, p=0.070; see Table A30). Respondents aged ‘40–54’ (42.6%; OR=1.28, 95% CI=1.00–1.64, p=0.049) were more likely to use effective cessation assistance during a quit attempt when compared to those in the lowest group, aged ‘18–24’ (34.3%). Use of effective cessation assistance during a quit attempt was more likely among respondents who felt ‘somewhat addicted’ (35.7%; OR=1.91, 95% CI=1.45–2.50, p<.001) or ‘very addicted’ (47.7%; OR=3.29, 95% CI=2.48–4.36, p<.001) to cigarettes, when compared to those who felt ‘not at all’ addicted to cigarettes (20.5%). Use of any effective cessation assistance was less likely among respondents present in two (30.8%; OR=0.69, 95% CI=0.52–0.90, p=0.007) or three waves (31.3%; OR=0.58, 95% CI=0.39–0.88, p=0.011), compared to those present in one wave (39.9%). No differences were observed by sex-at-birth, ethnicity, education, or income.

Canada – As Figure 9 shows, 51.6% of respondents reported using effective cessation assistance (excluding e-cigarettes) during a quit attempt in 2016, which had a non-significant decrease to 48.1% in 2018 (OR= 0.91, 95% CI=0.75–1.09, p=0.295), and non-significant decrease to 46.3% in 2020 vs. 2018 (OR= 0.93, 95% CI=0.77–1.13, p=0.464; see Table A31). Respondents aged ‘40–

54' (52.0%; OR= 1.49, 95% CI=1.20–1.84, $p<.001$) and '55 and up' (56.9%; OR= 1.68, 95% CI=1.34–2.10, $p<.001$) were more likely to use effective cessation assistance during a quit attempt when compared to those in the lowest group, aged '18–24' (38.7%). 'White' respondents were less likely (48.9%; OR= 0.76, 95% CI=0.61–0.94, $p=0.011$) to use effective cessation assistance during an attempt to quit smoking, when compared to 'non-white' respondents (48.9%). Use of effective cessation assistance was more likely among respondents who felt 'somewhat addicted' (42.9%; OR= 1.91, 95% CI=1.48–2.48, $p<.001$) or 'very addicted' (59.6%; OR= 3.32, 95% CI=2.52–4.37, $p<.001$) to cigarettes, compared to those who felt 'not at all' addicted to cigarettes (27.0%). No differences were observed by sex-at-birth, education, income, or time in sample.

United States – As Figure 9 shows, 45.3% of respondents reported using effective cessation assistance (excluding e-cigarettes) during a quit attempt in 2016, which had a non-significant decrease to 42.0% in 2018 (OR= 0.87, 95% CI=0.66–1.15, $p=0.326$), and non-significant increase to 44.3% in 2020 vs. 2018 (OR= 1.09, 95% CI=0.80–1.48, $p=0.584$; see Table A32). Respondents aged '40–54' (48.1%; OR= 1.52, 95% CI=1.10–2.09, $p=0.011$) and '55 and up' (52.5%; OR= 1.75, 95% CI=1.31–2.35, $p<.001$) were more likely to use effective cessation assistance during a quit attempt when compared to those in the lowest group, aged '18–24' (34.1%). Respondents with 'high' education were more likely (47.5%; OR= 1.37, 95% CI=0.99–1.89, $p=0.059$) to use effective cessation assistance during an attempt to quit smoking, when compared to those with 'low' education (43.4%). Use of effective cessation assistance was more likely among respondents who felt 'somewhat addicted' (40.3%; OR= 2.33, 95% CI=1.67–3.24, $p<.001$), 'very addicted' (53.9%; OR= 4.01, 95% CI=2.89–5.57, $p<.001$), or did not state their perceived level of addiction to cigarettes (37.9%; OR= 2.51, 95% CI=1.11–5.66, $p=0.027$), when compared to those who felt 'not at all' addicted to cigarettes (22.3%). No differences were observed by sex-at-birth, ethnicity, income, or time in sample.

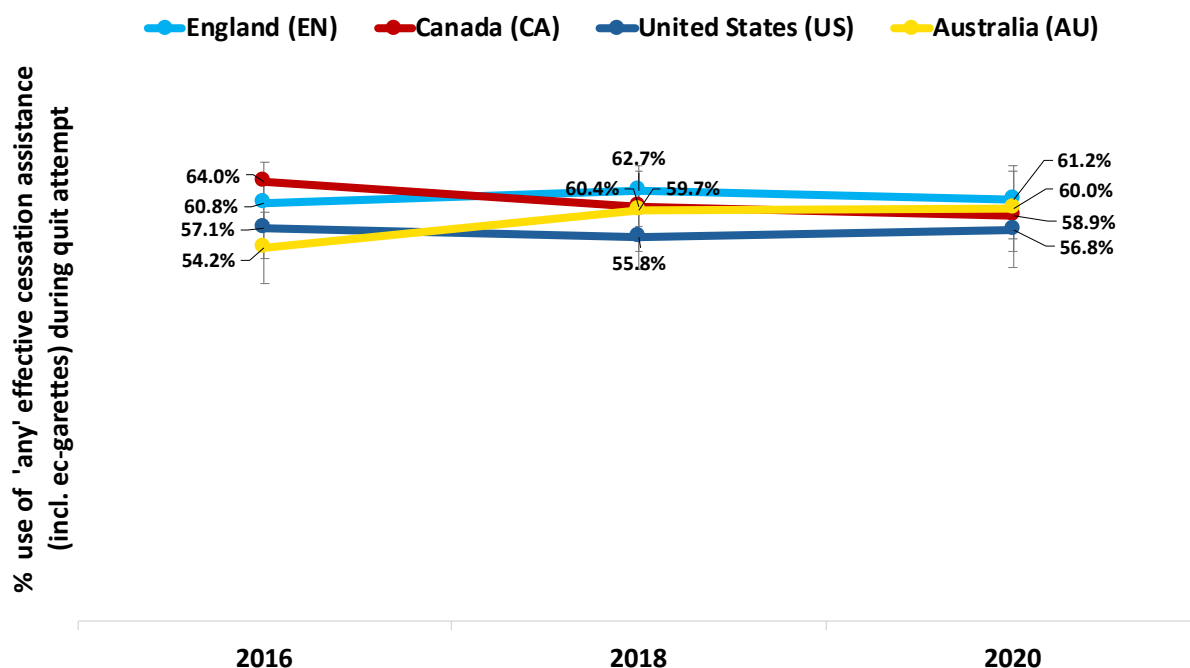
Australia – As Figure 9 shows, 48.8% of respondents reported using effective cessation assistance (excluding e-cigarettes) during a quit attempt in 2016, with no change in 2018 (48.8%; OR= 1.13, 95% CI=0.78–1.64, $p=0.505$), and a non-significant decrease to 45.7% in 2020 vs. 2018 (OR= 1.07, 95% CI=0.72–1.58, $p=0.745$; see Table A33). Respondents aged '40–54' (59.6%; OR= 3.13, 95% CI=1.59–6.17, $p=0.001$) and '55 and up' (55.9%; OR= 2.81, 95% CI=1.41–5.60, $p=0.004$) were more likely to use effective cessation assistance during a quit attempt when compared to those in the lowest group, aged '18–24' (30.0%). Use of effective cessation assistance during a quit attempt was more likely among respondents who felt 'somewhat addicted' (38.2%; OR= 2.77, 95% CI=1.51–5.08, $p=0.001$) or 'very addicted' (59.8%; OR= 5.64, 95% CI=3.03–10.52, $p<.001$) to cigarettes, when compared to those who felt 'not at all' addicted to cigarettes (19.0%). Respondents present in three survey waves were less likely to use effective cessation assistance (33.6%; OR=0.41, 95% CI=0.26–0.66, $p<.001$) during an attempt to quit smoking, when compared to those present in only one wave (50.7%). No differences were observed by sex-at-birth, ethnicity, education, or income.

4.4 Use of ‘any’ effective cessation assistance (incl. e-cigarettes)

Across all countries, among individuals with an attempt to quit smoking in the past 12-months prior to survey date, more than half (59.4%; Table 4) of respondents used ‘any’ form of effective cessation assistance (including e-cigarettes). The following section summarizes the findings from generalized estimating equation (GEE) models examining changes in using ‘any’ effective cessation assistance (including e-cigarettes) within each country over time.

Figure 10 shows the prevalence of ‘any’ effective cessation assistance (incl. e-cigarettes) used during an attempt to quit smoking in the past 12-months across all countries and survey years. Stratified country regression models are included in the Appendix and described below.

Figure 10. Use of ‘any’ effective cessation assistance (incl. e-cigarettes) among people with an attempt to quit smoking in the past 12-months.



England— As Figure 10 shows, 60.8% of respondents reported using ‘any’ effective cessation assistance (including e-cigarettes) during a quit attempt in 2016, which had a non-significant increase to 62.7% in 2018 (OR= 1.08, 95% CI=0.85–1.36, p=0.540), and a non-significant decrease to 61.2% in 2020 vs. 2018 (OR= 1.02, 95% CI=0.78–1.35, p=0.871; see Table A34). Use of any effective cessation assistance during a quit attempt was more likely among respondents aged ‘40–54’ (69.2%; OR= 1.57, 95% CI=1.21–2.03, p=0.001) compared to those aged ‘18–24’ (53.1%). Respondents were less likely to use any effective cessation assistance (including e-cigarettes) during a quit attempt if they had ‘moderate’ (61.0%; OR= 0.79, 95% CI=0.64–0.97, p=0.027) or ‘high’ education (56.9%; OR= 0.65, 95% CI=0.51–0.84, p=0.001) compared to those with ‘low’ education (68.5%). Those who did not state their level of income were less likely (48.4%; OR= 0.62, 95% CI=0.43–0.89, p=0.010) to use any effective cessation assistance during a quit attempt compared to those with ‘low’ income (61.8%). Respondents were more likely to

use any effective cessation assistance during a quit attempt if they felt 'somewhat addicted' (55.4%; OR= 1.58, 95% CI=1.23–2.03, $p<.001$) or 'very addicted' (76.0%; OR= 3.81, 95% CI=2.90–5.01, $p<.001$) to cigarettes, when compared to those who felt 'not at all' addicted to cigarettes (42.0%). No differences were observed by sex-at-birth, ethnicity, or time in sample.

Canada – As Figure 10 shows, 64.0% of respondents reported using 'any' effective cessation assistance (including e-cigarettes) during a quit attempt in 2016, which decreased to 60.4% in 2018 (OR= 0.82, 95% CI=0.68–1.00, $p=0.050$), and a non-significant decrease to 58.9% in 2020 vs. 2018 (OR= 0.91, 95% CI=0.75–1.12, $p=0.384$; see Table A35). Use of any effective cessation assistance (including e-cigarettes) during a quit attempt was more likely among those who felt 'somewhat addicted' (55.3%; OR= 1.65, 95% CI=1.31–2.08, $p<.001$), 'very addicted' (71.1%; OR= 3.04, 95% CI=2.36–3.93, $p<.001$), or did not state their level of perceived addiction to cigarettes (68.0%; OR=2.59, 95% CI=1.26–5.34, $p=0.010$), when compared to those who felt 'not at all' addicted to cigarettes (43.0%; see table 36). Respondents present in two waves were more likely (61.7%; OR=1.25, 95% CI=1.02–1.52, $p=0.031$) to use any effective cessation assistance during a quit attempt compared to those present in one wave (61.2%). No differences were observed by age group, sex-at-birth, ethnicity, education, or income.

United States – As Figure 10 shows, 57.1% of respondents reported using 'any' effective cessation assistance (including e-cigarettes) during a quit attempt in 2016, which had a non-significant decrease to 55.8% in 2018 (OR= 0.95, 95% CI=0.72–1.25, $p=0.713$), and non-significant increase to 56.8% in 2020 vs. 2018 (OR= 1.05, 95% CI=0.77–1.43, $p=0.752$; see Table A36). Respondents with 'high' education were more likely (60.4%; OR= 1.47, 95% CI=1.06–2.03, $p=0.021$) to use any effective cessation assistance (including e-cigarettes) during an attempt to quit smoking, compared to those with 'low' education (53.9%). Use of any effective cessation assistance during a quit attempt was more likely among respondents who felt 'somewhat addicted' (53.6%; OR= 1.71, 95% CI=1.22–2.39, $p=0.002$) or 'very addicted' (65.0%; OR= 2.79, 95% CI=2.02–3.86, $p<.001$) to cigarettes, when compared to those who felt 'not at all' addicted to cigarettes (38.6%). No differences were observed by age group, sex-at-birth, ethnicity, income, or time in sample.

Australia – As Figure 10 shows, 54.2% of respondents reported using 'any' effective cessation assistance (including e-cigarettes) during a quit attempt in 2016, which had a non-significant increase to 59.7% 2018 (OR= 1.33, 95% CI=0.92–1.92, $p=0.132$), and to 60.0% in 2020 vs. 2018 (OR= 1.10, 95% CI=0.74–1.62, $p=0.649$; see Table A37). Use of any effective cessation assistance was more likely among respondents aged '40–54' (66.6%; OR= 2.26, 95% CI=1.19–4.29, $p=0.012$) compared to those in the lowest group, aged '18–24' (44.3%). Respondents who felt 'very addicted' to cigarettes were more likely (46.9%; OR= 2.47, 95% CI=1.49–4.10, $p<.001$) to use any effective cessation assistance (including e-cigarettes) during a quit attempt compared to those who felt 'not at all' addicted to cigarettes (42.5%). No differences were observed sex-at-birth, ethnicity, education, income, or time in sample.

5.0 DISCUSSION

The overall goal of this thesis was to explore how the use of e-cigarettes for smoking cessation compares to trends in the use of other effective cessation assistance such as nicotine replacement therapy (NRT), prescription pharmacological therapies (PPT), counselling services, telephone/quitlines, and self-help assistance methods in Canada, the United States, England, and Australia. This study aimed to examine trends over time, changes within each country, and changes by different sociodemographic characteristics, including age. The following sections provide further discussion of these findings alongside current literature and use of cessation aid estimates from national surveys where data is available. Overall, the results of this study demonstrate that among respondents with an attempt to quit smoking in the past 12-months, many people used some form of cessation assistance during their last quit attempt. Despite differences in regulatory environments, one main finding was that e-cigarettes or NRT were the most frequently used aids in all countries and survey years. Section 5.2 characterizes these trends within each country against national survey estimates and describe any changes e-cigarettes contribute to overall use of cessation assistance. In brief, e-cigarettes were a popular cessation aid in all countries however, there was little change in overall use of effective aids, except for Australia where there is some evidence to suggest e-cigarettes may have increased overall cessation assistance. Additional context is given in section 5.3 where changes in use of other cessation methods is also examined to further understand the overall trends in any effective cessation aids. Finally, section 5.4 concludes with a discussion of sociodemographic factors associated with use of cessation assistance. This analysis found that age was associated with use of e-cigarettes in all countries excluding the US; and nearly all models showed that perceived addiction was associated with use of various forms of cessation assistance.

5.1 Overall use of cessation assistance during an attempt to quit smoking

The current study is among the first to examine population-level trends in the use of cessation assistance among individuals with an attempt to quit smoking across countries. Overall, there were strikingly similar rates of cessation assistance used across all four countries, despite differences in tobacco control policies and rates of e-cigarette use. In 2020, between 57-61% of respondents across the four countries used some form of effective cessation assistance (including e-cigarettes) during a recent attempt to quit smoking. To our knowledge, few other studies have examined overall use of effective aids in other countries; among those that have, the definitions of 'effective' categories differ. For example, a 2014-16 brief report of US adult cigarette smokers, found that 75% of people used multiple cessation methods during a recent quit attempt; however, this study does not define which methods are included in these estimates (30). Another US study that analysed data from the Tobacco Use Supplement Current Population Survey (TUS-CPS) reported that 39% of US adults who made an attempt to quit in 2022 used 'some form' of cessation support (58). Regardless of differences in the magnitude of these estimates, these studies show that many people trying to quit smoking will use some form of assistance, even if these individual methods of cessation assistance may vary across countries and studies.

5.2 E-cigarettes for smoking cessation

The current study adds to the literature that vaping is an increasingly popular method of cessation assistance among adults trying to quit in these four countries. These findings are consistent with previous studies showing that vaping is an increasingly common method of quitting smoking in many high-income countries (30–33). The prevalence of using e-cigarette for quitting varied between countries. As hypothesized, the prevalence of e-cigarette use during a quit attempt was higher in countries with more permissive e-cigarette policies (e.g., England), compared to countries with more restrictive policies (e.g., Australia). However, in contrast to the original hypothesis, there was little evidence that changes in the use of e-cigarettes as a cessation method corresponded with trends in the overall use of cessation assistance among smokers who attempted to quit. In Australia, modest increases were observed in the use of any cessation assistance in parallel with larger increases in the use of e-cigarettes as a quit; however, in England there was an inverse relationship between use of e-cigarettes and other assistance, with little to no changes in the US and Canada. The following sections discuss the country-specific patterns in greater detail.

5.2.1 Trends in use of cessation methods in England

In England, e-cigarette use as a cessation aid increased between 2016 to 2018 and then decreased in 2020, with the peak prevalence levels in 2018 (47%). In the initial period in which the use of e-cigarettes as a quit aid increased, there was some decline observed in the use of NRT, and no change in the use of other effective cessation methods. As the use of e-cigarettes as a cessation aid declined from 2018-2020, there was an inverse relationship between e-cigarette use and other effective cessation assistance during an attempt to quit smoking. For example, as use of e-cigarettes declined, the use of prescription therapies, self-help services, and telephone/quitline use increased, such that there were no overall changes in the use of ‘any’ effective cessation assistance among adults with an attempt to quit smoking. This inverse pattern may suggest that some users transitioned from other cessation supports to e-cigarette use during a quit attempt between these survey waves, however additional research on this effect is limited.

An early analysis of data from the Smoking Toolkit Study (STS) in England between 2011 and 2014 found that, e-cigarettes contributed to growth in the overall ‘nicotine-containing product’ use (i.e., NRT and/or e-cigarettes) from 2011 to 2013 (59). During this period, there was a steep increase in the use of e-cigarettes to help stop smoking or cut down on cigarette use while the use of ‘licensed nicotine products’ (i.e., NRT) remained relatively constant (59). After 2013, overall nicotine-containing product use began to decrease. This period is characterized by little change in e-cigarette use, and a gradual decline among licensed nicotine products (59). Thus, since e-cigarettes and ‘licensed nicotine products’ did not reflect inverse patterns of use, it is not likely that any increase in e-cigarette use is attributable to a decrease in ‘licensed nicotine product’ use during an attempt to quit smoking (59). A more recent analysis of STS data between 2007 to 2022 found that, while prevalence of using NRT and prescription medication during a quit attempt declined over time, there was only modest evidence that decline in the use of NRT was associated with the increase in use of e-cigarettes as a quit method (60). It is unclear whether these associations would reach conventional levels of statistical significance if NRT and prescription medications were aggregated, rather than analysed separately. Notably,

the toolkit data reflects a positive association between prevalence of e-cigarette use and success rate of quit attempts in England wherein additional smokers have been able to successfully achieve cessation with the use of e-cigarettes (60). As increases in quit success subsequently lead to fewer overall quit attempts, it is possible that associations between e-cigarettes and quitting outcomes will weaken, as users who successfully quit with the help of e-cigarettes transition out of the remaining smoking population (60). However, it is important to note that the main aim of this thesis was to characterize and explore the patterns of use across different cessation assistance over time and therefore the overall scope of this study does not consider changes to the overall quit rate as a function of quit attempts and success over time.

5.2.2 Trends in use of cessation methods in Canada

Trends in use of cessation assistance methods in Canada and the United States were similar. In both countries, use of e-cigarettes during a quit attempt remained consistent around 25%, while use of any effective cessation assistance (including e-cigarettes) had little to no change over time. These estimates reflect similar results from other studies and national monitoring reports. In Canada, cessation support estimates can be compared to the Canadian Tobacco and Nicotine Survey (CTNS). CTNS results show similar trends in e-cigarette and NRT use as seen in the current study, though to a greater magnitude. In 2019, CTNS reports that 35% of adults tried to quit smoking with the use of a vaping device (46) with a decline to 27% in 2020 (31). The present study also saw some decline in e-cigarette use during this time with 29% of adults using an e-cigarette to quit in 2018, then declining to 28% in 2020. For NRT use, results from CTNS found that 26% of adults used NRT during an attempt to quit in 2019 (46) and increased to 32% 2020 (31). The present study also saw some increase in NRT use during this time with 34% of adults using an NRT to quit in 2018, rising to 35% in 2020. Trends in use of other effective cessation methods such as quitlines, medication, or apps are less clear as they are not consistently reported in the annual CTNS findings each year (31,34,46).

5.2.3 Trends in use of cessation methods in the United States

In the US, approximately one-quarter of adults reported the use of an e-cigarette from 2016-2020, with a decline from 30% in 2020 to 25% in 2018. Although national surveys in the US do not report data on e-cigarette use as a cessation aid, these estimates are similar to other findings. A nationally representative study spanning 2014-2016, found that adult smokers 'commonly used' either, e-cigarettes (25%) or NRT (25%) during an attempt to quit smoking (30). However, a notable finding was that many respondents substituted e-cigarettes for some conventional cigarettes more frequently than using other FDA-approved methods of quitting smoking (30). Use of these other methods had much lower estimates compared to e-cigarettes and NRT; this includes advice from a health professional (15%), FDA-approved medications (12%), internet-based help (7%), and telephone quitline (5%) (30). Further, this study found that many people used multiple cessation aids during a quit attempt (30). Therefore, it is plausible that with the availability and use of e-cigarettes in cessation attempts, there are little changes in the overall trends of effective cessation supports (including e-cigarettes) in Canada and the United States. E-cigarettes may support existing cessation methods during an attempt to quit without changing current preferences for cessation aids among people trying to quit smoking.

Data from national surveys in the US provide monitoring estimates on the use of other cessation aids. For example, 2018 estimates from the Tobacco Use Supplement to the Current Population Survey (TUS-CPS) data shows 34% of US adults who made an attempt to quit, used some form of ‘evidence-based cessation treatment’ (58,61). The report defines evidence-based treatment as any use of behavioural counselling (e.g., quitline, internet source, or clinician) and/or medication use (e.g., NRT, bupropion and/or varenicline). Overall, the trends in this report are consistent with the current study, as both findings showed no changes in the use of evidence-based cessation treatment among adults trying to quit smoking (58,61).

When looking at the use of different cessation aid types, the most recent 2022 TUS-CPS data report that more than one-third of US adults who made an attempt to quit in 2022 used ‘some form’ of cessation support, including use of NRT (31%), prescription therapies (10%), counselling services (5%), telephone/quitline (4%), internet programs (3%), and clinic/support group (2%). In 2020, the current study found higher use of prescription medication and self-help services (i.e., internet), and similar estimates for NRT use, telephone/quitline, and counselling services when compared to 2022 TUS-CPS estimates. Differences in the magnitude of these estimates may be explained due to time, sampling, and cessation method groups. Both studies report non-exclusive use of quit aids among those with an attempt to quit in the past year, where the TUS-CPS reports reflect more recent estimates compared to results in the present study that may have changed since time of survey. Further, the present study asks both recent quitters and current smokers about their last quit attempt, the TUS-CPS only asks this of adults who currently smoke ‘every day’ or ‘some day’ (62). Prevalence of self-help services used during a quit attempt in the present study are compared to estimates for internet/web-based applications reported in the 2022 TUS-CPS, however, these cannot be directly compared, as the ITC estimates for self-help services includes a few cessation methods that are not all included in the TUS-CPS survey (63). Both surveys include any use of mobile apps or automated services, internet/websites for quitting, while the ITC survey has an additional response option that includes any use of pamphlets, books, or brochures on how to quit.

Another report of TUS-CPS data shows that use of counselling services increased 4% from 2010-18 (58,61) while another US study reported that NRT sales declined between 2017-2022 (64). A repeated cross-sectional analysis of adults who smoke in the US used data from the medical expenditures panel survey (MEPS) which found that trends in use of physician advice to quit smoking increased from 2006 (60%) to 2015 (65%), while use of prescription medication decreased by one percentage point, to 5% use in 2015 (65). The present study found an opposite direction of trends, where the use of counselling/clinic services decreased in the period that prescription therapy increased. This may be due to differences in timing and sample of data as the MEPS survey ends before the present study period, and MEPS data suggests that use of prescription use began to increase after 2015. Also, these estimate of physician services for cessation advice were much larger than those reported in the present study, as the MEPS survey asked respondents if they received advice to quit during their last clinical visit (65).

5.2.4 Trends in use of cessation methods in Australia

Finally, Australia had the highest magnitude of change in e-cigarette use for smoking cessation. Prevalence of e-cigarette use during a quit attempt increased from 11% in 2016 to 25% in 2020.

Use of NRT during this time was stable at around 30%. Data from the National Drug Strategy Household Survey (NDSHS) shows that e-cigarettes have become more popular forms of cessation assistance in Australia, as prevalence of e-cigarette use to quit and/or reduce smoking increased from 14% in 2019 to 20% in 2022 (66). Similarly, NRT use remained constant in the NDSHS surveys, with an estimated prevalence of 17% from 2019-2022, somewhat lower than the current estimates (66,67). Overall, trends observed in the current study are generally similar to the available data from national monitoring surveys.

There was some evidence in Australia that increased use of e-cigarettes aligned with an overall increase of effective cessation assistance to quit smoking. E-cigarette use in Australia more than doubled between 2016 and 2020, from 11% to 25% while the use of any effective cessation increased over the same period, albeit more modestly than the increase in e-cigarette use (6 percentage points, from 54% in 2016 to 60% in 2020, versus the 14-percentage point increase in the use of e-cigarettes as a quit method). During this period, there were few changes in the use of other forms of cessation assistance, with the exception of a reduction in other therapeutic products (i.e., prescription medication). It is possible that more people in Australia were using more than one method of quitting during this time, as this behaviour has been observed in US studies (30,68). To our knowledge, data on national trends on smoking cessation behaviours in Australia are limited. Recent data from the 2022-2023 National Drug Strategy Household Survey, showed that use of e-cigarettes has increased among those trying to cut down on cigarette consumption as well as those aiming to quit tobacco cigarettes completely (66). Use of other cessation methods include quitting cold turkey, discussing smoking and health at home, and NRT products; however, trends over time were not reported (66).

5.3 Trends in use of ‘other’ cessation assistance methods

Few changes were observed in the overall use of cessation assistance from 2016-2020; however, some changes were observed among individual categories of quit aids, including self-help and counselling services.

Trends in use of cessation assistance methods may have been affected by the COVID-19 pandemic. Use of counselling services during a quit attempt decreased by about half from 2018 to 2020, while use of self-help services increased during this time (see table 3). These effects are likely due to reductions of in-person services during the COVID-19 pandemic thereby leading to a shift towards virtual support services. 2020 ITC data were collected online from February to June 2020 (53) mainly after widespread closures of in-person services. A study by Jackson et al., observed similar changes in England and found significant increases in ‘traditional’ remote support services including telephone support, websites, and self-help materials in the pandemic period compared to pre-pandemic levels (69). Jackson et al., also report an increase in the use of prescription medication (including NRT) – specifically use of varenicline – during the pandemic period (69). Though the present study does not examine changes in the specific types of prescription medications, our paper found some change observed in overall use of any prescription pharmacological therapy (PPT; varenicline, bupropion, and cytisine). Our results show a similar change in the use of PPT from 11.7% in 2018 to 13.2% in 2020; an increase that returned PPT use back to baseline 2016 levels (see table 3). Overall, the Jackson et al. study did not find significant changes in other categories of

cessation aids in the pre-pandemic and pandemic period (69), which is consistent with the general trends of cessation aids reported in our analysis.

5.4 Sociodemographic factors associated with use of cessation assistance

This study hypothesized that use of e-cigarette for smoking cessation would be more likely to occur among younger participants. The results showed that this was observed in some countries, but age-related trends were not consistently seen in all regions. Younger participants in Canada and the US—and, to a lesser extent, in Australia—were more likely to use e-cigarettes during an attempt to quit smoking compared to older respondents, with no age-related trends in England. These findings are consistent with other studies which show a higher prevalence of e-cigarette use during a quit attempt among younger age groups (20,70). Though differences in country level trends may reflect the varying attitudes and regulatory environments towards e-cigarettes in these countries. For example, in England where e-cigarette prevalence for quitting smoking is highest with no differences across all age groups, there is a more permissive landscape for these cessation aids. E-cigarettes are promoted by National Health Service (NHS) as a less harmful alternative to cigarettes, which can ‘help [individuals] quit smoking for good’ (71). While in Australia a stronger conservative approach to e-cigarettes exists where, Australians require a prescription to access nicotine containing e-cigarette products (72). Canada and the US lie between these two environments, where government websites share information that e-cigarettes may be an effective cessation aid, but are not ‘approved’ cessation methods and individuals should try to quit with approved methods first (73,74). With differences in public health messaging across countries, it may be possible that the use of e-cigarettes is higher among young people in Canada and the US, where adults have higher misperceptions about relative harms of e-cigarettes. For example, data from the PATH study found that adults in the US incorrectly believe that e-cigarettes can be equally/more harmful than cigarettes; and the proportion of misinformed adults who smoke increased from 2013-2016 (75). While, qualitative interviews with US young adults aged 18-25, report that young people found e-cigarettes to be a safer alternative to smoking due to positive vaping experiences (76). A 2016 ITC analysis examined factors that influenced relative harm perception between conventional and e-cigarettes. This study found that perceived portrayal of NVPs in media sources was a key factor influencing harmfulness perceptions (77). Contextual sociodemographic factors, such as age, had different impact on perceptions across countries. For example, in the US, young people aged 18-39 who perceived NRT being less harmful than smoking, perceived vaping information as being negative/balanced/don’t know were more likely to hold a “correct” relative risk perception of NVPs; while this same group in England held incorrect perceptions (77). Thus, the combination of country-specific policy environment and messaging are key considerations on the influence of harm perception and potentially explain differences in use of e-cigarettes among different age groups.

The cessation aid hypothesis assumes that people who use alternate forms of nicotine cessation aids (either through NRT, prescription, or e-cigarettes) will have some level of nicotine dependence since these devices operate under a mechanism of replacing nicotine delivery to the user (78). Thus, it is plausible that individuals with higher levels of dependence are likely to use these methods during an attempt to quit smoking. In this study, perceived

addiction acts as a proxy measure for dependence among those trying to quit. Individuals who reported greater addiction to smoking were more likely to report using e-cigarettes in all countries, with the exception of the United States. Perceived addiction was also associated with the use of 'any' cessation assistance. Previous literature has found associations between tobacco/nicotine dependence and use of cessation aids during an attempt to quit smoking (79–82). These studies report that individuals with higher levels of nicotine dependence or greater levels of 'heaviness of smoking,' are more likely to use some form of cessation treatment such as NRT, medication, or behavioural support (79–82).

5.5 Limitations

As a repeat cross-sectional analysis, this study is unable to establish causal relationships at the individual-level between the use of e-cigarettes and other forms of cessation assistance over time.

Directly testing substitution between quit methods presents challenges given that many adults use more than one method during an attempt to quit smoking (30,32,68). The current analysis did not consider models of individual-level predictors of using specific cessation methods. Accordingly, the analysis focused on population-level changes in the use of individual methods, with descriptive comparisons in changes across countries over time. In addition, there are a range of factors that could affect the use of different cessation methods, such that it is not possible to infer causality between the changes in the use of e-cigarettes versus other methods of quitting. For example, the onset of the COVID-19 pandemic in 2020 may have affected the use of some cessation methods more than others, such as the use of in-person counselling (69). Policy-related changes could also have affected the use of cessation methods, including changes in funding or delivery of smoking cessation services in each country.

Other limitations include varying intervals between survey waves. Wave 2 occurred after a 15-month period following Wave 1, whereas Wave 3 followed an 18-month gap from Wave 2. These differences in data collection are subject to differences in seasonal quitting behaviours (83,84). Differences in time intervals or seasonality may have affected the point prevalence of cessation methods across waves; however, this effect was constant across all quit methods and should not affect the relative differences or likelihood of using different quit methods. It is also important to note that, small subgroups limit the power to detect significant differences between waves, particularly when the sample was stratified by country. For example, the use of 'any' effective cessation assistance (including e-cigarettes) increased 6 percentage points in Australia from 2016–2020, but this increase was not found to be significant in the study sample ($p=0.078$).

Previous research has established that the frequency of vaping is an important mediator of the efficacy of vaping as a cessation aid: daily or frequent vaping is associated with increased smoking cessation, whereas less frequent vaping is associated with no impact or a negative impact on smoking cessation (18,20,22–29). The current study did not assess frequency of vaping during an attempt to quit smoking. Future studies may wish to assess the prevalence of 'daily vaping' as a cessation method.

Weighting limitations are also important to consider. Weights designed for former smoking participants have been designed to make these individuals as representative as possible of the country-specific population of former smoking individuals at the time of each wave of data collection, however, a majority of those participants were initially recruited as current smoking individuals (53). The ITC sample is recruited and weighted to be broadly representative of smokers in each country. However, estimates are subject to time-in-sample effects and the use of non-probability sampling in some cases. Compared to probability based national surveys (i.e., CTNS) and other probability-based studies (i.e., STS), the current study found similar trends in e-cigarette use over time, but estimates were lower in magnitude overall. More information on sample representativeness and recruitment is provided in the ITC technical reports (53).

The current study used 'perceived addiction to cigarettes' as a proxy to measure dependence levels because cigarettes-per-day at the time of last quit-attempt wasn't available for all respondents. Future studies should consider using established measures of dependence, where possible. Additional research may also wish to explore quitting history when examining the use of quit methods, given that previous experience with specific cessation aids is likely to influence future decisions (85,86).

Finally, the study is subject to limitations of self-reported data, including social desirability bias and recall biases. For example, respondent recall can influence details regarding cessation assistance used during a quit attempt in the past 12 months. Previous work has found that some smokers have poor recall of cessation methods (87,88), and with increasing time, recall of the attempt to quit smoking will decrease depending on the method of assistance used (88,89). However, this limitation is constant across countries, and likely did not influence changes in the use of specific quit methods over time.

6.0 CONCLUSION

As countries aim for less than 5% smoking prevalence by 2030 (49–52), this research examined an important question for understanding how e-cigarettes impact overall smoking cessation rates and the overall public health impact of vaping for people who smoke and are trying to quit.

The current study demonstrates that e-cigarettes are a popular choice of cessation method among those trying to quit smoking. However, there was little evidence that the use of e-cigarettes contributed to changes in the use of ‘any’ effective form of cessation assistance: overall use of any cessation assistance changed very little despite changes in e-cigarette use as a quit method in England and Australia. The extent of ‘substitution’ between individual quit methods is very difficult to assess at the population-level; however, there was some evidence consistent with substitution patterns for e-cigarettes and use of prescription therapies (PPT)—PPT increased in the UK as the use of e-cigarettes as a quit method decreases, with the inverse association in Australia—however, there was little evidence of substitution with NRT, as hypothesized. Overall, while e-cigarettes have proven to be an effective method of quitting for individual smokers (12), there is no consistent evidence that the use of e-cigarettes has had an effect on the use of ‘formal’ cessation methods during a quit attempt .

The current findings help to reconcile what on the surface appears to be conflicting findings in the literature: e-cigarettes are an effective quit method and many people are using e-cigarettes to quit, however, the cessation rates from 2016-2020 have not increased in some countries with high levels of e-cigarette use, including England and Canada (36,39,40,43). The current study found no differences in the use of ‘any’ effective form of cessation assistance during the period when the use of e-cigarettes as a quit aid fell. The current findings are similar to recent data from England which found no clear evidence that e-cigarettes were associated with the overall quit rate (60). In contrast, cessation rates have increased in the US in recent decades, which could reflect the impact of e-cigarettes as well as a range of other factors that may influence cessation rates, including major tobacco control policies and increase in cigarettes prices in recent years (37). In Australia, while prevalence of e-cigarette use is increasing, it is hard to assess impact on cessation rates as there has been no publicly available data, to our knowledge (67). Further research is needed to examine changes in the use of population smoking cessation methods to examine possible substitution effects with other quit aids more closely. Overall, the emergence of e-cigarettes represents a notable addition to the list of smoking cessation methods available to people who smoke; however, there is little evidence across the four countries examined in the current study that changes in e-cigarettes use has impacted overall rates of using effective smoking cessation assistance at the population level.

REFERENCES

1. World Health Organization (WHO). WHO Report on the Global Tobacco Epidemic, 2008: the MPOWER package [Internet]. Geneva: World Health Organization; [cited 2022 Aug 15]. Available from: <https://apps.who.int/iris/handle/10665/43818>
2. Reitsma MB, Kendrick PJ, Ababneh E, Abbafati C, Abbasi-Kangevari M, Abdoli A, et al. Spatial, temporal, and demographic patterns in prevalence of smoking tobacco use and attributable disease burden in 204 countries and territories, 1990–2019: a systematic analysis from the Global Burden of Disease Study 2019. *The Lancet*. 2021 Jun;397(10292):2337–60.
3. U.S. Department of Health and Human Services. Smoking Cessation: A Report of the Surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2020 p. 700.
4. Greenhalgh E, Dean E, Stillman S, Ford C. 7.16 Pharmacotherapies for smoking cessation. In: Greenhalgh E, Scollo M, Winstanley M, editors. *Tobacco in Australia: Facts and issues* [Internet]. Melbourne: Cancer Council Victoria; 2021 [cited 2022 Sep 29]. Available from: <https://www.tobaccoinaustralia.org.au/chapter-7-cessation/7-16-pharmacotherapy>
5. Health Canada. Quitting smoking: How to quit [Internet]. 2021 [cited 2022 Sep 29]. Available from: <https://www.canada.ca/en/health-canada/services/smoking-tobacco/quit-smoking/how.html>
6. Stead LF, Perera R, Bullen C, Mant D, Hartmann-Boyce J, Cahill K, et al. Nicotine replacement therapy for smoking cessation. *Cochrane Database Syst Rev* [Internet]. 2012 [cited 2023 May 9];(11). Available from: <https://www.readcube.com/articles/10.1002%2F14651858.cd000146.pub4>
7. US Preventative Services Task Force. Interventions for Tobacco Smoking Cessation in Adults, Including Pregnant Persons: US Preventive Services Task Force Recommendation Statement. *JAMA*. 2021;325(3):265–79.
8. Hartmann-Boyce J, McRobbie H, Lindson N, Bullen C, Begh R, Theodoulou A, et al. Electronic cigarettes for smoking cessation. *Cochrane Database Syst Rev*. 2020 Oct 14;2020(10):CD010216.
9. National Academies of Sciences, Engineering, and Medicine. Public Health Consequences of E-Cigarettes [Internet]. Stratton K, Kwan LY, Eaton DL, editors. Washington, D.C.: National Academies Press; 2018 [cited 2022 Aug 15]. Available from: <https://www.nap.edu/catalog/24952>
10. U.S. Department of Health and Human Services. The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General [Internet]. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention

and Health Promotion, Office on Smoking and Health; 2006 [cited 2022 Aug 17]. Available from: <http://doi.apa.org/get-pe-doi.cfm?doi=10.1037/e601432007-001>

11. U.S. Department of Health and Human Services. How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General [Internet]. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2010 [cited 2022 Aug 18]. Available from: <http://doi.apa.org/get-pe-doi.cfm?doi=10.1037/e590462011-001>
12. Lindson N, Butler AR, McRobbie H, Bullen C, Hajek P, Begh R, et al. Electronic cigarettes for smoking cessation. *Cochrane Database Syst Rev* [Internet]. 2024 [cited 2024 May 13];(1). Available from: <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD010216.pub8/full?highlight=Abstract=cigarets%7Ccessat%7Ccigarett%7Ce%7Csmoking%7Ccessation%7Csmoke%7Ccigarettes%7Ccigaret>
13. Farsalinos KE, Spyrou A, Tsimopoulou K, Stefopoulos C, Romagna G, Voudris V. Nicotine absorption from electronic cigarette use: comparison between first and new-generation devices. *Sci Rep*. 2014 Feb 26;4(1):4133.
14. Bullen C, McRobbie H, Thornley S, Glover M, Lin R, Laugesen M. Effect of an electronic nicotine delivery device (e cigarette) on desire to smoke and withdrawal, user preferences and nicotine delivery: randomised cross-over trial. *Tob Control*. 2010 Apr 1;19(2):98–103.
15. Hajek P, Phillips-Waller A, Przulj D, Pesola F, Myers Smith K, Bisal N, et al. A Randomized Trial of E-Cigarettes versus Nicotine-Replacement Therapy. *N Engl J Med*. 2019 Feb 14;380(7):629–37.
16. Vansickel AR, Eissenberg T. Electronic Cigarettes: Effective Nicotine Delivery After Acute Administration. *Nicotine Tob Res*. 2013 Jan 1;15(1):267–70.
17. Goniewicz ML, Kuma T, Gawron M, Knysak J, Kosmider L. Nicotine Levels in Electronic Cigarettes. *Nicotine Tob Res*. 2013 Jan 1;15(1):158–66.
18. Biener L, Hargraves JL. A Longitudinal Study of Electronic Cigarette Use Among a Population-Based Sample of Adult Smokers: Association With Smoking Cessation and Motivation to Quit. *Nicotine Tob Res*. 2015 Feb;17(2):127–33.
19. Wang RJ, Bhadriraju S, Glantz SA. E-Cigarette Use and Adult Cigarette Smoking Cessation: A Meta-Analysis. *Am J Public Health*. 2021 Feb;111(2):230–46.
20. Chen R, Pierce JP, Leas EC, Benmarhnia T, Strong DR, White MM, et al. Effectiveness of e-cigarettes as aids for smoking cessation: evidence from the PATH Study cohort, 2017–2019. *Tob Control* [Internet]. 2022 Jan 11 [cited 2022 Sep 29]; Available from: <https://tobaccocontrol.bmj.com/content/early/2022/01/11/tobaccocontrol-2021-056901>

21. Pasquereau A, Guignard R, Andler R, Nguyen-Thanh V. Electronic cigarettes, quit attempts and smoking cessation: a 6-month follow-up. *Addiction*. 2017;112(9):1620–8.
22. Kalkhoran S, Chang Y, Rigotti NA. Electronic Cigarette Use and Cigarette Abstinence Over 2 Years Among U.S. Smokers in the Population Assessment of Tobacco and Health Study. *Nicotine Tob Res*. 2020 Apr 21;22(5):728–33.
23. Kalkhoran S, Chang Y, Rigotti NA. E-cigarettes and Smoking Cessation in Smokers With Chronic Conditions. *Am J Prev Med*. 2019 Dec 1;57(6):786–91.
24. Miller CR, Smith DM, Goniewicz ML. Changes in Nicotine Product Use among Dual Users of Tobacco and Electronic Cigarettes: Findings from the Population Assessment of Tobacco and Health (PATH) Study, 2013–2015. *Subst Use Misuse*. 2020 Apr 1;55(6):909–13.
25. Berry KM, Reynolds LM, Collins JM, Siegel MB, Fetterman JL, Hamburg NM, et al. E-cigarette initiation and associated changes in smoking cessation and reduction: the Population Assessment of Tobacco and Health Study, 2013–2015. *Tob Control*. 2019 Jan 1;28(1):42–9.
26. Kasza KA, Edwards KC, Tang Z, Stanton CA, Sharma E, Halenar MJ, et al. Correlates of tobacco product cessation among youth and adults in the USA: findings from the PATH Study Waves 1–3 (2013–2016). *Tob Control*. 2020 May 1;29(Suppl 3):s203–15.
27. Zhuang YL, Cummins SE, Sun JY, Zhu SH. Long-term e-cigarette use and smoking cessation: a longitudinal study with US population. *Tob Control*. 2016 Oct 1;25(Suppl 1):i90–5.
28. Levy DT, Yuan Z, Luo Y, Abrams DB. The Relationship of E-Cigarette Use to Cigarette Quit Attempts and Cessation: Insights From a Large, Nationally Representative U.S. Survey. *Nicotine Tob Res*. 2018 Jul 9;20(8):931–9.
29. Farsalinos KE, Niaura R. E-cigarettes and Smoking Cessation in the United States According to Frequency of E-cigarette Use and Quitting Duration: Analysis of the 2016 and 2017 National Health Interview Surveys. *Nicotine Tob Res*. 2020 Apr 21;22(5):655–62.
30. Caraballo RS, Shafer PR, Patel D, Davis KC, McAfee TA. Quit Methods Used by US Adult Cigarette Smokers, 2014–2016. *Prev Chronic Dis*. 2017 Apr 13;14:E32.
31. Health Canada. Canadian Tobacco and Nicotine Survey (CTNS): 2020 detailed tables [Internet]. 2022 [cited 2022 Aug 31]. Available from: <https://www.canada.ca/en/health-canada/services/canadian-tobacco-nicotine-survey/2020-summary/2020-detailed-tables.html>
32. Gravely S, Cummings KM, Hammond D, Borland R, McNeill A, East KA, et al. Self-Reported Quit Aids and Assistance Used By Smokers At Their Most Recent Quit Attempt: Findings from the 2020 International Tobacco Control Four Country Smoking and Vaping Survey. *Nicotine Tob Res*. 2021 Apr 9;23(10):1699–707.

33. Kock L, West R, Beard E, Kale D, Brown J. Smoking in England. 2022 [cited 2022 Sep 29]. Trends in electronic cigarette use in England. Available from: <https://smokinginengland.info/graphs/e-cigarettes-latest-trends>
34. Health Canada. Canadian Tobacco and Nicotine Survey (CTNS): summary of results for 2022 [Internet]. 2023 [cited 2024 Apr 12]. Available from: <https://www.canada.ca/en/health-canada/services/canadian-tobacco-nicotine-survey/2022-summary.html>
35. McNeill A, Brose L, Calder R, Simonavicius E, Robson D. Vaping in England: An evidence update including vaping for smoking cessation, February 2021: a report commissioned by Public Health England. London: Public Health England; 2021 p. 247.
36. Buss V, Kock L, West R, Beard E, Kale D, Brown J. Smoking in England. 2023 [cited 2023 Apr 27]. Trends in electronic cigarette use in England. Available from: <https://smokinginengland.info/graphs/e-cigarettes-latest-trends>
37. Méndez D, Le TTT, Warner KE. Monitoring the Increase in the U.S. Smoking Cessation Rate and Its Implication for Future Smoking Prevalence. *Nicotine Tob Res.* 2022 Apr 29;ntac115.
38. Zhu SH, Zhuang YL, Wong S, Cummins SE, Tedeschi GJ. E-cigarette use and associated changes in population smoking cessation: evidence from US current population surveys. *BMJ.* 2017 Jul 26;358:j3262.
39. Reid JL, Hammond D, Burkhalter R, Rynard VL. Tobacco Use in Canada: Patterns and Trends, 2022 Edition [Internet]. Waterloo, ON: University of Waterloo; 2022 [cited 2022 Oct 5] p. 124. Available from: www.uwaterloo.ca/tobacco-use-canada/
40. Canadian Community Health Survey. Prevalence of smoking and smoking cessation among Canadians 15+. 2017 2021.
41. Méndez D, Tam J, Giovino GA, Tsodikov A, Warner KE. Has Smoking Cessation Increased? An Examination of the US Adult Smoking Cessation Rate 1990–2014. *Nicotine Tob Res.* 2017 Nov 7;19(12):1418–24.
42. Jones JT, Xu K, Deng L, Sawdey MD, Reyes-Guzman CM, Chang CM, et al. Smoking cessation prevalence by menthol cigarette use and select demographics among adults in the United States, TUS-CPS, 2003–2019. *Prev Med Rep.* 2023 Sep 22;36:102440.
43. Beard EV, West R, Jarvis M, Michie S, Brown J. ‘S’-shaped curve: modelling trends in smoking prevalence, uptake and cessation in Great Britain from 1973 to 2016. *Thorax.* 2019 Sep 1;74(9):875–81.
44. Beard E, West R, Michie S, Brown J. Association of prevalence of electronic cigarette use with smoking cessation and cigarette consumption in England: a time–series analysis between 2006 and 2017. *Addict Abingdon Engl.* 2020 May;115(5):961–74.

45. Reid JL, Hammond D, Tariq U, Burkhalter R, Rynard VL, Douglas O. Tobacco Use in Canada: Patterns and Trends, 2019 Edition [Internet]. Waterloo, ON: Propel Centre for Population Health Impact, University of Waterloo; 2019 [cited 2023 May 8]. Available from: https://uwaterloo.ca/tobacco-use-canada/sites/default/files/uploads/files/tobacco_use_in_canada_2019.pdf
46. Health Canada. Canadian Tobacco and Nicotine Survey (CTNS): 2019 Detailed tables [Internet]. 2020 [cited 2023 May 9]. Available from: <https://www.canada.ca/en/health-canada/services/canadian-tobacco-nicotine-survey/2019-summary/2019-detailed-tables.html>
47. Tuchman AE. Advertising and Demand for Addictive Goods: The Effects of E-Cigarette Advertising. *Mark Sci*. 2019 Nov;38(6):994–1022.
48. Huang J, Wang Y, Duan Z, Kim Y, Emery SL, Chaloupka FJ. Do e-cigarette sales reduce the demand for nicotine replacement therapy (NRT) products in the US? Evidence from the retail sales data. *Prev Med*. 2021 Apr;145:106376.
49. Health Canada. Overview of Canada’s Tobacco Strategy. 2018 [cited 2022 Aug 15]. Canada’s Tobacco Strategy. Available from: <https://www.canada.ca/en/health-canada/services/publications/healthy-living/canada-tobacco-strategy/overview-canada-tobacco-strategy.html>
50. Department of Health. Consultation Draft National Tobacco Strategy 2022–2030 [Internet]. Canberra: Department of Health; 2022 [cited 2022 Oct 7] p. 42. Available from: https://consultations.health.gov.au/atodb/national-tobacco-strategy-2022-2030/supporting_documents/Draft%20NTS%2020222030%20for%20consultaion%20hub.pdf
51. Khan J. Making smoking obsolete: summary [Internet]. London: Office for Health Improvement and Disparities; 2022 Aug [cited 2022 Oct 7]. Available from: <https://www.gov.uk/government/publications/the-khan-review-making-smoking-obsolete/making-smoking-obsolete-summary>
52. Nargis N. Healthy People Countdown 2030: reaching 5% cigarette smoking prevalence among US adults through state cigarette excise tax increases. *Tob Control* [Internet]. 2021 Sep 15 [cited 2022 Oct 7]; Available from: <https://tobaccocontrol.bmj.com/content/early/2022/09/21/tobaccocontrol-2021-056755>
53. ITC Project. ITC Four Country Smoking and Vaping Survey, Wave 3 (4CV3, 2020) Technical Report [Internet]. University of Waterloo, Waterloo, Ontario, Canada; Medical University of South Carolina, Charleston, South Carolina, United States; Cancer Council Victoria, Melbourne, Australia; the University of Queensland, Australia; King’s College London, London, United Kingdom; 2021 Jul [cited 2023 May 10]. Available from: https://itcproject.s3.amazonaws.com/uploads/documents/4CV3_Technical_Report_23Jul2021_2.pdf

54. Royal College of Physicians. Smoking and health 2021: A coming of age for tobacco control? [Internet]. London, UK: Royal College of Physicians; 2021 Apr [cited 2023 Mar 26]. Available from: <https://www.rcplondon.ac.uk/projects/outputs/smoking-and-health-2021-coming-age-tobacco-control>
55. ITC Project. ITC Four Country Smoking and Vaping Survey Wave 1 (2016) Technical Report [Internet]. University of Waterloo, Waterloo, Ontario, Canada; Medical University of South Carolina, Charleston, South Carolina, United States; Cancer Council Victoria, Melbourne, Australia; King's College London, London, United Kingdom; 2018 Nov [cited 2024 Apr 23]. Available from: https://itcproject.s3.amazonaws.com/uploads/documents/4CV1_Technical_Report_Nov23201.pdf
56. ITC Project. ITC Four Country Smoking and Vaping Survey, Wave 2 (2018) Technical Report [Internet]. University of Waterloo, Waterloo, Ontario, Canada; Medical University of South Carolina, Charleston, South Carolina, United States; Cancer Council Victoria, Melbourne, Australia; the University of Queensland, Australia; King's College London, London, United Kingdom; 2020 Jan [cited 2024 Apr 23]. Available from: https://itcproject.s3.amazonaws.com/uploads/documents/4CV2_Technical_Report_15Jan202.pdf
57. D'Mello K, East K, Fong GT, McNeill A, Hammond D. The Use of Vaping Products in Attempts to Stop Smoking: Trends over time and possible substitution for other smoking cessation aids in Canada, the United States, England, and Australia. OSF Registry [Internet]. 2023 Aug 25 [cited 2024 Mar 26]; Available from: <https://osf.io/jpnqc>
58. National Cancer Institute. Tobacco Use Supplement Current Population Survey (TUS-CPS) Data Brief: Select Estimates from September 2022 Data Collection [Internet]. [cited 2024 Apr 24]. Available from: <https://cancercontrol.cancer.gov/sites/default/files/2024-02/TUSDataBriefFinal-508.pdf>
59. Beard E, Brown J, McNeill A, Michie S, West R. Has growth in electronic cigarette use by smokers been responsible for the decline in use of licensed nicotine products? Findings from repeated cross-sectional surveys. *Thorax*. 2015 Oct;70(10):974–8.
60. Jackson SE, Brown J, Beard E. Associations of Prevalence of E-cigarette Use With Quit Attempts, Quit Success, Use of Smoking Cessation Medication, and the Overall Quit Rate Among Smokers in England: A Time-Series Analysis of Population Trends 2007–2022. *Nicotine Tob Res*. 2024 Jun 21;26(7):826–34.
61. National Cancer Institute. Cancer Trends Progress Report. 2024 [cited 2024 Apr 24]. Online Summary of Trends in US Cancer Control Measures: Evidence-based Cessation Treatment. Available from: <https://progressreport.cancer.gov/prevention/cessation-aids>

62. United States Census Bureau. Current Population Survey, September 2022 Tobacco Use Supplement File Technical Documentation CPS—22 [Internet]. Washington, US Census Bureau; 2022 September [cited 2024 Apr 23]. Available from: <https://www2.census.gov/programs-surveys/cps/techdocs/cpssep22.pdf>
63. National Cancer Institute. 2022-2023 TUS-CPS Questionnaire for September 2022, January 2023, and May 2023 Fielding Final [Internet]. 2024 Jun [cited 2024 Apr 23]. Available from: https://cancercontrol.cancer.gov/sites/default/files/2024-01/9-22TUSCPS_Quest-508.pdf
64. Trigger S, Xu X, Malarcher A, Salazar E, Shin H, Babb S. Trends in Over-the-Counter Nicotine Replacement Therapy Sales, U.S., 2017–2020. *Am J Prev Med*. 2023 May;64(5):650–7.
65. Tibuakuu M, Okunrintemi V, Jirru E, Echouffo Tcheugui JB, Orimoloye OA, Mehta PK, et al. National Trends in Cessation Counseling, Prescription Medication Use, and Associated Costs Among US Adult Cigarette Smokers. *JAMA Netw Open*. 2019 May 3;2(5):e194585.
66. Australian Institute of Health and Welfare [Internet]. 2024 [cited 2024 Apr 15]. National Drug Strategy Household Survey 2022–2023: Tobacco smoking in the NDSHS. Available from: <https://www.aihw.gov.au/reports/smoking/tobacco-smoking-ndshs>
67. Australian Institute of Health and Welfare. National Drug Strategy Household Survey 2019. 2020 [cited 2024 May 6]; Available from: <https://www.aihw.gov.au/reports/illicit-use-of-drugs/national-drug-strategy-household-survey-2019/contents/table-of-contents>
68. Soulakova JN, Crockett LJ. Unassisted Quitting and Smoking Cessation Methods Used in the United States: Analyses of 2010–2011 Tobacco Use Supplement to the Current Population Survey Data. *Nicotine Tob Res*. 2017 Dec 13;20(1):30–9.
69. Jackson SE, Cox S, Shahab L, Brown J. Prevalence of use and real-world effectiveness of smoking cessation aids during the COVID-19 pandemic: a representative study of smokers in England. *Addict Abingdon Engl*. 2022 Sep;117(9):2504–14.
70. Brown J, Beard E, Kotz D, Michie S, West R. Real-world effectiveness of e-cigarettes when used to aid smoking cessation: a cross-sectional population study. *Addiction*. 2014;109(9):1531–40.
71. The NHS. Using e-cigarettes to stop smoking [Internet]. 2022 [cited 2024 May 7]. Available from: <https://www.nhs.uk/live-well/quit-smoking/using-e-cigarettes-to-stop-smoking/>
72. Department of Health and Aged Care. About vaping and e-cigarettes [Internet]. 2024 [cited 2024 May 7]. Available from: <https://www.health.gov.au/topics/smoking-vaping-and-tobacco/about-vaping>
73. Health Canada. Vaping and quitting smoking [Internet]. 2022 [cited 2024 May 7]. Available from: <https://www.canada.ca/en/health-canada/services/smoking-tobacco/vaping/quit-smoking.html>

74. U.S. Department of Health & Human Services. Adult Smoking Cessation—The Use of E-Cigarettes [Internet]. 2023 [cited 2024 May 7]. Available from: <https://www.cdc.gov/tobacco/sgr/2020-smoking-cessation/fact-sheets/adult-smoking-cessation-e-cigarettes-use/index.html>
75. Malt L, Verron T, Cahours X, Guo M, Weaver S, Walele T, et al. Perception of the relative harm of electronic cigarettes compared to cigarettes amongst US adults from 2013 to 2016: analysis of the Population Assessment of Tobacco and Health (PATH) study data. *Harm Reduct J*. 2020 Sep 18;17(1):65.
76. Ceasar RC, Braymiller JL, Kechter A, Simpson KA, Schiff SJ, Yamaguchi N, et al. Perceiving E-Cigarettes as Safe and Safer Alternative to Cigarettes Among Young Adults. *Subst Use Addict J*. 2024 Apr;45(2):181–90.
77. Yong HH, Karmakar C, Motin MA, Borland R, Elton-Marshall T, Cummings KM, et al. Identifying factors that conjointly influence nicotine vaping product relative harm perception among smokers and recent ex-smokers: Findings from the 2016 ITC Four Country Smoking and Vaping Survey. *Drug Alcohol Depend*. 2021 Jan 1;218:108370.
78. Selya AS, Dierker L, Rose JS, Hedeker D, Mermelstein RJ. The Role of Nicotine Dependence in E-Cigarettes' Potential for Smoking Reduction. *Nicotine Tob Res*. 2018 Sep 4;20(10):1272–7.
79. Shiffman S, Brockwell SE, Pillitteri JL, Gitchell JG. Use of Smoking-Cessation Treatments in the United States. *Am J Prev Med*. 2008 Feb 1;34(2):102–11.
80. Kotz D, Fidler J, West R. Factors associated with the use of aids to cessation in English smokers. *Addiction*. 2009;104(8):1403–10.
81. Myers MG, Strong DR, Linke SE, Hofstetter CR, Al-Delaimy WK. Predicting use of assistance when quitting: A longitudinal study of the role of quitting beliefs. *Drug Alcohol Depend*. 2015 Apr 1;149:220–4.
82. Zhu SH, Melcer T, Sun J, Rosbrook B, Pierce JP. Smoking cessation with and without assistance: A population-based analysis. *Am J Prev Med*. 2000 May 1;18(4):305–11.
83. Chandra S, Gitchell JG, Shiffman S. Seasonality in Sales of Nicotine Replacement Therapies: Patterns and Implications for Tobacco Control. *Nicotine Tob Res*. 2011;13(5):395–8.
84. Graham AL, Cha S, Cobb NK, Fang Y, Niaura RS, Mushro A. Impact of Seasonality on Recruitment, Retention, Adherence, and Outcomes in a Web-Based Smoking Cessation Intervention: Randomized Controlled Trial. *J Med Internet Res*. 2013 Nov 7;15(11):e2880.
85. Partos TR, Borland R, Yong HH, Hyland A, Cummings KM. The Quitting Rollercoaster: How Recent Quitting History Affects Future Cessation Outcomes (Data From the International Tobacco Control 4-Country Cohort Study). *Nicotine Tob Res*. 2013 Sep;15(9):1578–87.

86. Chaiton M, Diemert L, Cohen JE, Bondy SJ, Selby P, Philipneri A, et al. Estimating the number of quit attempts it takes to quit smoking successfully in a longitudinal cohort of smokers. *BMJ Open*. 2016 Jun;6(6):e011045.
87. Hammond D, McDonald PW, Fong GT, Borland R. Do smokers know how to quit? Knowledge and perceived effectiveness of cessation assistance as predictors of cessation behaviour. *Addiction*. 2004;99(8):1042–8.
88. Borland R, Partos TR, Cummings KM. Systematic Biases in Cross-sectional Community Studies may Underestimate the Effectiveness of Stop-Smoking Medications. *Nicotine Tob Res*. 2012 Dec 1;14(12):1483–7.
89. Kasza KA, Hyland AJ, Borland R, McNeill AD, Bansal-Travers M, Fix BV, et al. Effectiveness of stop-smoking medications: findings from the International Tobacco Control (ITC) Four Country Survey. *Addiction*. 2013;108(1):193–202.

APPENDIX

Figure A1. Aids used in most recent quit attempt: data from smoking toolkit study, England(36).

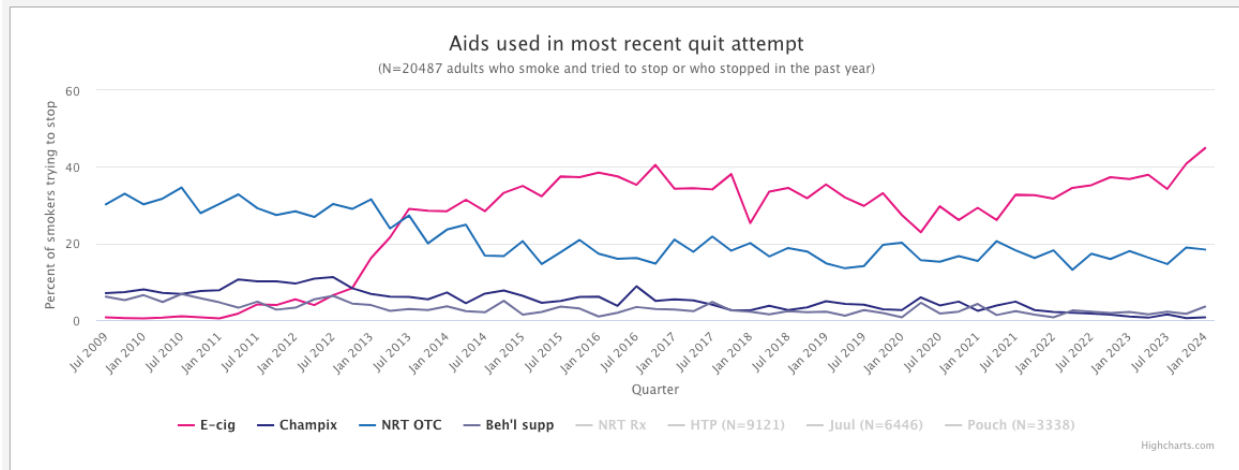


Table A1. Derived categories of cessation assistance method used at last quit attempt

Use of Cessation Assistance – Categories (6 categories)	Individual cessation assistance categories (23 categories)¹
E-cigarette²	E-cigarette/Vape
Any Nicotine Replacement Therapy (NRT)^{2,3}	Nicotine Patch
	Nicotine gum
	Nicotine lozenges.
	Nicotine mouth spray.
	UK: Nicotine inhaler/ inhalator, e.g., Voke Otherwise: Nicotine inhaler/ inhalator
	Nicotine sublingual tablets.
	Nicotine dissolvable oral strips.
Any Prescription Pharmacological Therapy (PPT)^{2,3}	Nicotine nasal spray.
	Other nicotine product.
	Varenicline or Chantix or Champix.
Telephone/ Quitline^{2,3}	Bupropion or Zyban or Wellbutrin.
	Cytisine [Cravv]
Counselling^{2,3}	Telephone or quitline
	Counselling/clinic/program
Self-help	A smoking cessation session offered by your doctor's office
	Apps or automated services on a mobile phone or tablet.
	The internet -- i.e., a website about quitting smoking.
	Pamphlets, books, or brochures on how to quit.

¹ Categories are not mutually exclusive.

² Included in *Use of 'Any' Effective Cessation Assistance* category, where 1 = e-cigarettes, NRT, PPT, Telephone/ Quitline, Counselling, and 0 = all else.

³ Included in *Use of Effective Cessation Assistance* category: note that effective forms of cessation assistance were based on clinical practice guidelines and evidence reviews; where, 1 = NRT, PPT, Telephone/ Quitline, Counselling, and 0 = all else.

Table A2. Any use of cessation assistance among people with an attempt to quit smoking in the past 12-months months in Canada (n=4,880)*

	2016 (n=1,887)	2018 (n=1,572)	2020 (n=1,421)
	% (n)	% (n)	% (n)
E-cigarette	28.4 (536)	29.2 (459)	27.7 (393)
Nicotine Replacement Therapy (NRT)	36.5 (689)	34.1 (536)	35.2 (500)
Nicotine Patch	20.9 (394)	18.8 (296)	19.1 (272)
Nicotine gum	19.4 (365)	19.6 (308)	21.3 (302)
Nicotine lozenges.	5.9 (112)	5.6 (88)	5.9 (83)
Nicotine mouth spray.	2.7 (51)	3.4 (54)	5.4 (76)
UK: Nicotine inhaler/ inhalator, e.g. Voke; Otherwise: Nicotine inhaler/ inhalator	3.9 (74)	2.6 (41)	3.8 (53)
Nicotine sublingual tablets.	0.4 (8)	0.2 (3)	0.6 (8)
Nicotine dissolvable oral strips.	0.4 (7)	0.5 (8)	0.3 (4)
Nicotine nasal spray.	0.1 (3)	0.5 (7)	0.5 (7)
Other nicotine product.	0.6 (11)	0.2 (3)	0.6 (8)
Prescription pharmacological therapy	14.7 (278)	12.1 (190)	13.1 (186)
Varenicline or Chantix or Champix.	11.2 (210)	9.1 (143)	10.1 (144)
Bupropion or Zyban or Wellbutrin.	5.1 (96)	3.3 (51)	3.7 (53)
Cytisine [Cravv]	n/a	0.7 (11)	0.6 (9)
Telephone or Quitline	2.1 (40)	2.1 (33)	3.1 (44)
Counselling	13.4 (253)	11.6 (182)	5.9 (84)
Counselling/clinic/program	3.7 (70)	3.4 (53)	3.4 (48)
A smoking cessation session offered by your doctor's office	11.5 (218)	9.5 (150)	3.2 (46)
Self-help	21.6 (408)	17.4 (273)	19.3 (274)
Apps or automated services on a mobile phone or tablet.	4.0 (76)	3.4 (53)	5.5 (79)
The internet -- i.e. a website about quitting smoking.	14.2 (268)	11.1 (175)	12.0 (171)
Pamphlets or brochures on how to quit.	3.8 (72)	7.1 (112)	8.4 (120)

*Categories are not mutually exclusive.

Table A3. Any use of cessation assistance among people with an attempt to quit smoking in the past 12-months months in the United States (n=2,912)*

	2016 (n=1,237)	2018 (n=945)	2020 (n=730)
	% (n)	% (n)	% (n)
E-cigarette	24.8 (307)	26.1 (246)	22.0 (161)
Nicotine Replacement Therapy (NRT)	30.0 (371)	25.3 (239)	30.4 (222)
Nicotine Patch	20.0 (248)	16.7 (158)	18.7 (136)
Nicotine gum	12.4 (154)	8.9 (84)	11.5 (84)
Nicotine lozenges.	4.8 (59)	4.5 (43)	6.2 (45)
Nicotine mouth spray.	1.5 (18)	0.4 (4)	0.4 (3)
UK: Nicotine inhaler/ inhalator, e.g. Voke; Otherwise: Nicotine inhaler/ inhalator	1.0 (12)	1.1 (11)	0.5 (4)
Nicotine sublingual tablets.	0.5 (6)	0.5 (5)	0.1 (1)
Nicotine dissolvable oral strips.	0.8 (10)	0.4 (4)	0.2 (2)
Nicotine nasal spray.	0.5 (6)	0.1 (1)	0 (0)
Other nicotine product.	0.3 (4)	0.3 (3)	1.8 (13)
Prescription pharmacological therapy	14.7 (182)	15.3 (144)	17.2 (126)
Varenicline or Chantix or Champix.	10.0 (124)	8.9 (85)	12.2 (89)
Bupropion or Zyban or Wellbutrin.	7.0 (86)	5.9 (56)	6.3 (46)
Cytisine [Cravv]	n/a	1.1 (11)	0.2 (2)
Telephone or Quitline	4.5 (55)	4.9 (46)	4.2 (31)
Counselling	11.1 (137)	10.1 (95)	4.5 (33)
Counselling/clinic/program	2.7 (34)	2.3 (22)	3.2 (23)
A smoking cessation session offered by your doctor's office	9.8 (121)	8.8 (83)	1.7 (13)
Self-help	13.7 (170)	9.2 (87)	11.7 (85)
Apps or automated services on a mobile phone or tablet.	2.4 (30)	2.9 (27)	3.4 (25)
The internet -- i.e. a website about quitting smoking.	9.2 (114)	6.2 (59)	6.1 (45)
Pamphlets or brochures on how to quit.	6.2 (77)	3.2 (30)	5.5 (40)

*Categories are not mutually exclusive.

Table A4. Any use of cessation assistance among people with an attempt to quit smoking in the past 12-months months in England (n=4,486)*

	2016 (n=1,950)	2018 (n=1,644)	2020 (n=1,252)
	% (n)	% (n)	% (n)
E-cigarette	37.1 (723)	46.7 (768)	39.9 (500)
Nicotine Replacement Therapy (NRT)	26.8 (524)	23.7 (390)	25.0 (313)
Nicotine Patch	16.4 (321)	13.3 (219)	12.3 (154)
Nicotine gum	10.7 (208)	9.8 (161)	10.3 (129)
Nicotine lozenges.	4.6 (90)	5.6 (92)	5.0 (63)
Nicotine mouth spray.	3.9 (76)	3.4 (55)	3.6 (45)
UK: Nicotine inhaler/ inhalator, e.g. Voke; Otherwise: Nicotine inhaler/ inhalator	4.2 (82)	3.7 (61)	2.5 (31)
Nicotine sublingual tablets.	0.7 (13)	0.4 (7)	1.3 (16)
Nicotine dissolvable oral strips.	0.8 (16)	0.4 (7)	0.2 (3)
Nicotine nasal spray.	0.8 (15)	0.8 (13)	0.5 (6)
Other nicotine product.	0.5 (9)	0.8 (13)	2.6 (33)
Prescription pharmacological therapy	8.7 (170)	7.7 (127)	10.3 (129)
Varenicline or Chantix or Champix.	7.4 (144)	6.3 (104)	6.9 (87)
Bupropion or Zyban or Wellbutrin.	2.0 (38)	1.9 (31)	2.0 (25)
Cytisine [Cravv]	n/a	-	2.3 (29)
Telephone or Quitline	2.6 (50.9)	2.0 (33)	4.1 (51)
Counselling	14.7 (287)	12.3 (203)	10.2 (127)
Counselling/clinic/program	7.9 (154)	6.6 (108)	5.5 (69)
A smoking cessation session offered by your doctor's office	9.7 (188)	7.6 (125)	5.5 (69)
Self-help	17.5 (341)	16.7 (275)	23.7 (296)
Apps or automated services on a mobile phone or tablet.	4.8 (94)	5.7 (94)	5.4 (68)
The internet -- i.e. a website about quitting smoking.	11.1 (216)	10.3 (170)	16.7 (210)
Pamphlets or brochures on how to quit.	6.1 (119)	5.7 (94)	6.7 (84)

*Categories are not mutually exclusive.

Table A5. Any use of cessation assistance among people with an attempt to quit smoking in the past 12-months months in Australia (n=1,898)*

	2016 (n=796)	2018 (n=578)	2020 (n=524)
	% (n)	% (n)	% (n)
E-cigarette	11.1 (88)	21.3 (123)	25.1 (132)
Nicotine Replacement Therapy (NRT)	30.9 (246)	30.8 (178)	31.6 (166)
Nicotine Patch	20.1 (160)	18.7 (108)	20.7 (109)
Nicotine gum	10.4 (83)	6.8 (39)	8.9 (46)
Nicotine lozenges.	3.7 (29)	6.8 (40)	6.5 (34)
Nicotine mouth spray.	5.9 (47)	7.1 (41)	7.2 (37)
UK: Nicotine inhaler/ inhalator, e.g. Voke; Otherwise: Nicotine inhaler/ inhalator	2.3 (18)	3.0 (17)	3.3 (17)
Nicotine sublingual tablets.	0.5 (4)	0.4 (2)	0.4 (2)
Nicotine dissolvable oral strips.	0.9 (7)	0.5 (3)	0.1 (1)
Nicotine nasal spray.	-	0.6 (4)	0.5 (3)
Other nicotine product.	0.2 (1)	0.4 (2)	1.7 (9)
Prescription pharmacological therapy	18.7 (149)	14.9 (86)	14.7 (77)
Varenicline or Chantix or Champix.	17.7 (141)	13.3 (77)	14.1 (74)
Bupropion or Zyban or Wellbutrin.	1.4 (11)	1.5 (8)	1.0 (5)
Cytisine [Cravv]	n/a	0.1 (1)	0.3 (2)
Telephone or Quitline	4.9 (39)	3.8 (22)	5.3 (28)
Counselling	9.3 (74)	10.8 (62)	4.6 (24)
Counselling/clinic/program	1.3 (11)	2.7 (16)	3.2 (17)
A smoking cessation session offered by your doctor's office	8.4 (67)	8.5 (49)	2.5 (13)
Self-help	14.2 (113)	13.7 (79)	18.4 (97)
Apps or automated services on a mobile phone or tablet.	6.6 (52)	6.4 (37)	9.9 (52)
The internet -- i.e. a website about quitting smoking.	7.1 (57)	7.4 (43)	10.2 (53)
Pamphlets or brochures on how to quit.	4.1 (33)	3.7 (21)	6.5 (34)
Other / No aid	47.1 (375)	47.4 (274)	51.8 (272)
Smokeless tobacco -- i.e. snus, chew, or dip.	-	-	-
A heated tobacco product.	n/a	0.2 (1)	0.5 (3)
Other (specify).	7.9 (63)	5.6 (33)	7.5 (40)
None of above	39.2 (312)	41.5 (240)	44.0 (230)

*Categories are not mutually exclusive.

GEE Results: Cessation categories: E-cigarettes

Table A6. GEE results examining any use of an e-cigarette during an attempt to quit smoking in the past 12-months among respondents in England, 2016-2020 (n=4,846)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=9.61$, $p=0.008$)				
Wave 1 (2016)	37.1 (723)	Reference		
Wave 2 (2018)	46.7 (768)	0.33	1.40 (1.13 - 1.73)	0.002
Wave 3 (2020)	39.9 (500)	0.05	1.06 (0.83 - 1.35)	0.670
Wave 3 (2020) vs. Wave 2 (2018)	-	-0.28	0.76 (0.58 - 0.98)	0.032
Age Group ($\chi^2=8.53$, $p=0.036$)				
18-24	36.6 (374)	Reference		
25-39	41.6 (761)	0.09	1.09 (0.86 - 1.39)	0.490
40-54	46.2 (507)	0.21	1.23 (0.97 - 1.56)	0.090
55 and up	38.8 (348)	-0.13	0.88 (0.69 - 1.14)	0.335
Sex ($\chi^2=0.02$, $p=0.895$)				
Female	41.6 (981)	Reference		
Male	40.6 (1009)	-0.01	0.99 (0.84 - 1.17)	0.895
Ethnicity ($\chi^2=0.1$, $p=0.951$)				
Non-white (CA, US & EN) or non-English (AU)	38.1 (172)	Reference		
White (CA, US & EN) or English (AU)	41.4 (1784)	0.00	1.00 (0.74 - 1.35)	0.997
Not stated	39.8 (34)	0.12	1.12 (0.53 - 2.38)	0.765
Education ($\chi^2=15.38$, $p=0.002$)				
Low	46.2 (316)	Reference		
Moderate	41.2 (1346)	-0.17	0.84 (0.69 - 1.02)	0.078
High	35.8 (280)	-0.45	0.64 (0.51 - 0.80)	<.001
Not stated	42.3 (48)	-0.02	0.98 (0.54 - 1.81)	0.957
Income ($\chi^2=5.8$, $p=0.122$)				
Low	41.0 (394)	Reference		
Moderate	41.7 (631)	0.07	1.07 (0.85 - 1.36)	0.554
High	42.0 (846)	0.14	1.15 (0.92 - 1.44)	0.228
Not stated	33.6 (120)	-0.27	0.76 (0.53 - 1.10)	0.146
Perceived addiction to cigarettes ($\chi^2=35.79$, $p=<.001$)				
Not at all	29.7 (205)	Reference		
Yes – somewhat addicted	37.8 (820)	0.33	1.39 (1.08 - 1.78)	0.009
Yes – very addicted	48.9 (931)	0.73	2.07 (1.60 - 2.68)	<.001
Not stated	40.4 (35)	0.43	1.53 (0.81 - 2.91)	0.193
Time in Sample ($\chi^2=4.62$, $p=0.099$)				
in 1 wave	39.6 (1526)	Reference		
in 2 waves	46.1 (344)	0.10	1.11 (0.86 - 1.44)	0.434
in 3 waves	48.1 (120)	0.41	1.50 (1.04 - 2.17)	0.030

Table A7. GEE results examining any use of an e-cigarette during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=2.02$, $p=0.364$)				
Wave 1 (2016)	28.4 (536)	Reference		
Wave 2 (2018)	29.2 (459)	-0.05	0.96 (0.78 - 1.17)	0.662
Wave 3 (2020)	27.7 (393)	-0.15	0.86 (0.69 - 1.07)	0.167
Wave 3 (2020) vs. Wave 2 (2018)	-	-0.11	0.90 (0.73 - 1.11)	0.319
Age Group ($\chi^2=123.66$, $p<.001$)				
18-24	39.8 (250)	Reference		
25-39	34.2 (531)	-0.29	0.75 (0.61 - 0.92)	0.005
40-54	28.4 (410)	-0.57	0.57 (0.46 - 0.70)	<.001
55 and up	15.7 (198)	-1.32	0.27 (0.21 - 0.34)	<.001
Sex ($\chi^2=0.12$, $p=0.731$)				
Female	28.6 (595)	Reference		
Male	28.3 (794)	0.03	1.03 (0.88 - 1.21)	0.731
Ethnicity ($\chi^2=0.29$, $p=0.865$)				
Non-white (CA, US & EN) or non-English (AU)	33.0 (261)	Reference		
White (CA, US & EN) or English (AU)	27.6 (1105)	-0.04	0.96 (0.78 - 1.18)	0.696
Not stated	26.9 (22)	-0.15	0.86 (0.45 - 1.65)	0.655
Education ($\chi^2=0.27$, $p=0.965$)				
Low	29.0 (372)	Reference		
Moderate	27.7 (605)	0.00	1.00 (0.82 - 1.22)	0.990
High	29.3 (404)	0.01	1.01 (0.81 - 1.26)	0.943
Not stated	24.4 (7)	-0.26	0.77 (0.28 - 2.15)	0.619
Income ($\chi^2=0.61$, $p=0.895$)				
Low	30.5 (317)	Reference		
Moderate	27.2 (372)	-0.07	0.93 (0.74 - 1.17)	0.538
High	28.8 (621)	-0.03	0.97 (0.78 - 1.20)	0.757
Not stated	25.0 (77)	-0.11	0.89 (0.63 - 1.27)	0.532
Perceived addiction to cigarettes ($\chi^2=4.66$, $p=0.199$)				
Not at all	27.4 (148)	Reference		
Yes – somewhat addicted	28.9 (590)	0.14	1.16 (0.90 - 1.49)	0.267
Yes – very addicted	28.1 (634)	0.27	1.30 (0.99 - 1.71)	0.056
Not stated	37.3 (16)	0.43	1.54 (0.67 - 3.50)	0.307
Time in Sample ($\chi^2=6.03$, $p=0.049$)				
in 1 wave	27.9 (928)	Reference		
in 2 waves	29.5 (337)	0.24	1.27 (1.03 - 1.57)	0.025
in 3 waves	30.0 (124)	0.29	1.34 (0.96 - 1.87)	0.087

Table A8. GEE results examining any use of an e-cigarette during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=1.75$, $p=0.418$)				
Wave 1 (2016)	24.8 (306)	Reference		
Wave 2 (2018)	26.1 (246)	-0.05	0.95 (0.72 - 1.25)	0.703
Wave 3 (2020)	22.0 (161)	-0.22	0.80 (0.57 - 1.13)	0.199
Wave 3 (2020) vs. Wave 2 (2018)	-	-0.17	0.84 (0.61 - 1.16)	0.294
Age Group ($\chi^2=42.94$, $p<.001$)				
18-24	36.5 (149)	Reference		
25-39	25.3 (231)	-0.71	0.49 (0.35 - 0.69)	<.001
40-54	22.3 (197)	-0.85	0.43 (0.30 - 0.60)	<.001
55 and up	19.4 (137)	-1.08	0.34 (0.25 - 0.47)	<.001
Sex ($\chi^2=1.61$, $p=0.204$)				
Female	23.6 (335)	Reference		
Male	25.3 (378)	0.16	1.17 (0.92 - 1.48)	0.203
Ethnicity ($\chi^2=5.62$, $p=0.018$)				
Non-white (CA, US & EN) or non-English (AU)	20.3 (160)	Reference		
White (CA, US & EN) or English (AU)	26.1 (553)	0.33	1.40 (1.05 - 1.86)	0.021
Not stated	-	-	-	-
Education ($\chi^2=7$, $p=0.03$)				
Low	21.3 (306)	Reference		
Moderate	27.3 (283)	0.32	1.37 (1.06 - 1.77)	0.016
High	28.1 (124)	0.34	1.40 (1.01 - 1.94)	0.042
Not stated	-	-	-	-
Income ($\chi^2=5.2$, $p=0.158$)				
Low	20.7 (233)	Reference		
Moderate	27.7 (234)	0.36	1.43 (1.04 - 1.96)	0.026
High	28.1 (124)	0.24	1.27 (0.94 - 1.71)	0.126
Not stated	-	0.01	1.01 (0.25 - 4.12)	0.992
Perceived addiction to cigarettes ($\chi^2=3.65$, $p=0.301$)				
Not at all	22.2 (98)	Reference		
Yes – somewhat addicted	25.2 (258)	0.13	1.14 (0.78 - 1.65)	0.495
Yes – very addicted	25.2 (348)	0.24	1.27 (0.89 - 1.82)	0.185
Not stated	13.4 (8)	-0.33	0.72 (0.29 - 1.76)	0.471
Time in Sample ($\chi^2=2.6$, $p=0.273$)				
in 1 wave	24.3 (492)	Reference		
in 2 waves	25.8 (173)	0.27	1.32 (0.96 - 1.81)	0.093
in 3 waves	22.6 (48)	0.10	1.10 (0.55 - 2.23)	0.783

Table A9. GEE results examining any use of an e-cigarette during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=11.78$, $p=0.003$)				
Wave 1 (2016)	11.1 (88)	Reference		
Wave 2 (2018)	21.3 (123)	0.78	2.19 (1.35 - 3.56)	0.002
Wave 3 (2020)	25.1 (132)	0.83	2.29 (1.37 - 3.82)	0.002
Wave 3 (2020) vs. Wave 2 (2018)	-	0.04	1.05 (0.65 - 1.68)	0.855
Age Group ($\chi^2=11.02$, $p=0.012$)				
18-24	21.8 (58)	Reference		
25-39	21.6 (162)	-0.26	0.77 (0.37 - 1.61)	0.492
40-54	15.7 (75)	-0.62	0.54 (0.25 - 1.14)	0.106
55 and up	11.8 (48)	-0.97	0.38 (0.17 - 0.85)	0.018
Sex ($\chi^2=2.7$, $p=0.1$)				
Female	15.5 (135)	Reference		
Male	20.3 (208)	0.32	1.37 (0.94 - 2.01)	0.103
Ethnicity ($\chi^2=0.02$, $p=0.888$)				
Non-white (CA, US & EN) or non-English (AU)	22.1 (47)	Reference		
White (CA, US & EN) or English (AU)	17.6 (296)	-0.04	0.96 (0.55 - 1.68)	0.889
Not stated	-	-	-	-
Education ($\chi^2=1.71$, $p=0.426$)				
Low	14.9 (104)	Reference		
Moderate	17.4 (124)	0.14	1.15 (0.73 - 1.81)	0.555
High	23.5 (114)	0.32	1.38 (0.85 - 2.26)	0.195
Not stated	-	-	-	-
Income ($\chi^2=2.07$, $p=0.559$)				
Low	14.9 (55)	Reference		
Moderate	18.9 (88)	0.13	1.14 (0.60 - 2.16)	0.685
High	19.7 (185)	0.06	1.06 (0.59 - 1.91)	0.834
Not stated	11.7 (14)	-0.44	0.65 (0.26 - 1.61)	0.347
Perceived addiction to cigarettes ($\chi^2=9.78$, $p=0.021$)				
Not at all	29.1 (44)	Reference		
Yes – somewhat addicted	14.2 (99)	-0.78	0.46 (0.25 - 0.84)	0.012
Yes – very addicted	18.5 (189)	-0.33	0.72 (0.41 - 1.26)	0.253
Not stated	36.9 (10)	0.71	2.04 (0.72 - 5.79)	0.182
Time in Sample ($\chi^2=4.97$, $p=0.083$)				
in 1 wave	15.2 (201)	Reference		
in 2 waves	21.2 (89)	-0.02	0.99 (0.62 - 1.57)	0.948
in 3 waves	33.5 (53)	0.73	2.08 (1.11 - 3.90)	0.022

GEE Results – Cessation categories: Nicotine Replacement Therapy

Table A10. GEE results examining any use of nicotine replacement therapy (NRT) during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=2.66$, $p=0.264$)				
Wave 1 (2016)	26.9 (524)	Reference		
Wave 2 (2018)	23.7 (390)	-0.16	0.85 (0.67 - 1.07)	0.168
Wave 3 (2020)	25.0 (313)	0.03	1.03 (0.78 - 1.36)	0.843
Wave 3 (2020) vs. Wave 2 (2018)	-	0.19	1.21 (0.92 - 1.60)	0.176
Age Group ($\chi^2=7.76$, $p=0.051$)				
18-24	21.6 (221)	Reference		
25-39	23.1 (423)	-0.04	0.96 (0.72 - 1.28)	0.795
40-54	29.9 (327)	0.28	1.32 (1.00 - 1.74)	0.049
55 and up	28.5 (256)	0.22	1.25 (0.93 - 1.66)	0.138
Sex ($\chi^2=0.14$, $p=0.707$)				
Female	25.9 (611)	Reference		
Male	24.7 (615)	-0.04	0.96 (0.80 - 1.17)	0.705
Ethnicity ($\chi^2=0.24$, $p=0.885$)				
Non-white (CA, US & EN) or non-English (AU)	23.5 (106)	Reference		
White (CA, US & EN) or English (AU)	25.6 (1101)	-0.09	0.91 (0.65 - 1.30)	0.616
Not stated	22.0 (19)	-0.08	0.92 (0.43 - 1.98)	0.839
Education ($\chi^2=0.78$, $p=0.855$)				
Low	27.8 (190)	Reference		
Moderate	25.0 (817)	-0.09	0.92 (0.73 - 1.15)	0.438
High	25.1 (197)	-0.06	0.94 (0.73 - 1.22)	0.659
Not stated	20.4 (23)	-0.22	0.80 (0.39 - 1.65)	0.552
Income ($\chi^2=1.58$, $p=0.664$)				
Low	25.4 (243)	Reference		
Moderate	25.0 (378)	0.07	1.07 (0.85 - 1.36)	0.554
High	26.1 (526)	0.14	1.15 (0.92 - 1.44)	0.228
Not stated	22.1 (79)	-0.27	0.76 (0.53 - 1.10)	0.146
Perceived addiction to cigarettes ($\chi^2=57.78$, $p<.001$)				
Not at all	13.3 (92)	Reference		
Yes – somewhat addicted	22.9 (495)	0.53	1.70 (1.25 - 2.31)	0.001
Yes – very addicted	33.0 (628)	1.06	2.88 (2.10 - 3.94)	<.001
Not stated	14.1 (12)	-0.01	0.99 (0.47 - 2.12)	0.987
Time in Sample ($\chi^2=1.48$, $p=0.476$)				
in 1 wave	25.9 (996)	Reference		
in 2 waves	23.0 (171)	-0.12	0.89 (0.67 - 1.18)	0.401
in 3 waves	23.6 (59)	-0.25	0.78 (0.49 - 1.25)	0.302

Table A11. GEE results examining any use of nicotine replacement therapy (NRT) during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=0.33$, $p=0.848$)				
Wave 1 (2016)	36.5 (689)	Reference		
Wave 2 (2018)	34.1 (536)	-0.05	0.95 (0.78 - 1.16)	0.599
Wave 3 (2020)	35.2 (500)	-0.01	0.99 (0.80 - 1.24)	0.947
Wave 3 (2020) vs. Wave 2 (2018)	-	0.05	1.05 (0.85 - 1.29)	0.668
Age Group ($\chi^2=9.72$, $p=0.021$)				
18-24	28.9 (182)	Reference		
25-39	30.9 (480)	0.04	1.04 (0.83 - 1.30)	0.723
40-54	38.2 (551)	0.24	1.27 (1.02 - 1.58)	0.030
55 and up	40.8 (513)	0.31	1.37 (1.08 - 1.73)	0.008
Sex ($\chi^2=0.27$, $p=0.606$)				
Female	36.1 (751)	Reference		
Male	34.8 (975)	-0.04	0.96 (0.82 - 1.12)	0.606
Ethnicity ($\chi^2=13.48$, $p=0.001$)				
Non-white (CA, US & EN) or non-English (AU)	34.9 (277)	Reference		
White (CA, US & EN) or English (AU)	35.8 (1432)	-0.21	0.81 (0.65 - 1.01)	0.059
Not stated	19.7 (16)	-1.14	0.32 (0.16 - 0.64)	0.001
Education ($\chi^2=3.61$, $p=0.306$)				
Low	39.9 (512)	Reference		
Moderate	34.8 (759)	-0.16	0.85 (0.70 - 1.03)	0.102
High	32.1 (443)	-0.16	0.85 (0.67 - 1.07)	0.164
Not stated	36.3 (11)	0.33	1.40 (0.54 - 3.58)	0.489
Income ($\chi^2=0.16$, $p=0.983$)				
Low	36.8 (383)	Reference		
Moderate	36.2 (496)	0.02	1.02 (0.82 - 1.27)	0.864
High	34.0 (734)	-0.01	0.99 (0.80 - 1.23)	0.926
Not stated	36.5 (113)	0.04	1.05 (0.75 - 1.46)	0.798
Perceived addiction to cigarettes ($\chi^2=103.76$, $p<.001$)				
Not at all	15.7 (85)	Reference		
Yes – somewhat addicted	29.6 (605)	0.74	2.10 (1.56 - 2.82)	<.001
Yes – very addicted	45.6 (1029)	1.33	3.77 (2.77 - 5.13)	<.001
Not stated	15.3 (7)	-0.16	0.85 (0.30 - 2.41)	0.759
Time in Sample ($\chi^2=0.13$, $p=0.939$)				
in 1 wave	35.6 (1183)	Reference		
in 2 waves	34.7 (396)	0.01	1.01 (0.83 - 1.24)	0.903
in 3 waves	35.5 (147)	-0.05	0.95 (0.69 - 1.32)	0.773

Table A12. GEE results examining any use of nicotine replacement therapy (NRT) during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=2.72$, $p=0.257$)				
Wave 1 (2016)	30.0 (371)	Reference		
Wave 2 (2018)	25.3 (239)	-0.16	0.86 (0.63 - 1.17)	0.327
Wave 3 (2020)	30.4 (222)	0.11	1.12 (0.77 - 1.62)	0.545
Wave 3 (2020) vs. Wave 2 (2018)	-	0.27	1.31 (0.93 - 1.84)	0.117
Age Group ($\chi^2=9.51$, $p=0.023$)				
18-24	21.5 (87)	Reference		
25-39	24.2 (222)	0.07	1.07 (0.74 - 1.55)	0.721
40-54	33.2 (294)	0.46	1.59 (1.13 - 2.24)	0.008
55 and up	32.5 (229)	0.35	1.42 (1.04 - 1.94)	0.028
Sex ($\chi^2=2.22$, $p=0.136$)				
Female	26.9 (382)	Reference		
Male	30.2 (450)	0.20	1.22 (0.94 - 1.57)	0.132
Ethnicity ($\chi^2=0.61$, $p=0.433$)				
Non-white (CA, US & EN) or non-English (AU)	28.0 (221)	Reference		
White (CA, US & EN) or English (AU)	28.8 (611)	-0.12	0.89 (0.66 - 1.19)	0.430
Not stated	-	-	-	-
Education ($\chi^2=3.98$, $p=0.137$)				
Low	27.1 (389)	Reference		
Moderate	29.2 (303)	0.13	1.14 (0.87 - 1.50)	0.340
High	31.9 (140)	0.35	1.43 (1.01 - 2.02)	0.046
Not stated	-	-	-	-
Income ($\chi^2=1.08$, $p=0.781$)				
Low	27.9 (314)	Reference		
Moderate	27.5 (232)	-0.04	0.96 (0.72 - 1.30)	0.800
High	31.9 (140)	0.05	1.05 (0.76 - 1.43)	0.778
Not stated	-	-0.63	0.53 (0.13 - 2.14)	0.375
Perceived addiction to cigarettes ($\chi^2=58.48$, $p<.001$)				
Not at all	13.0 (58)	Reference		
Yes – somewhat addicted	23.2 (238)	0.70	2.01 (1.34 - 3.01)	0.001
Yes – very addicted	37.4 (517)	1.39	4.01 (2.68 – 6.00)	<.001
Not stated	30.9 (19)	1.14	3.14 (1.37 - 7.21)	0.007
Time in Sample ($\chi^2=0.59$, $p=0.744$)				
in 1 wave	29.1 (590)	Reference		
in 2 waves	26.7 (179)	-0.12	0.89 (0.63 - 1.24)	0.479
in 3 waves	29.6 (63)	-0.15	0.86 (0.49 - 1.52)	0.606

Table A13. GEE results examining any use of nicotine replacement therapy (NRT) during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=2.27$, $p=0.321$)				
Wave 1 (2016)	30.9 (246)	Reference		
Wave 2 (2018)	30.8 (178)	0.17	1.19 (0.82 - 1.72)	0.361
Wave 3 (2020)	31.7 (166)	0.32	1.37 (0.91 - 2.07)	0.126
Wave 3 (2020) vs. Wave 2 (2018)	-	0.14	1.16 (0.78 - 1.70)	0.464
Age Group ($\chi^2=10.58$, $p=0.014$)				
18-24	19.3 (52)	Reference		
25-39	26.9 (201)	0.41	1.51 (0.69 - 3.28)	0.304
40-54	40.8 (194)	0.88	2.40 (1.13 - 5.10)	0.023
55 and up	35.1 (143)	0.75	2.12 (0.98 - 4.57)	0.057
Sex ($\chi^2=2.62$, $p=0.106$)				
Female	28.2 (246)	Reference		
Male	33.6 (344)	0.25	1.29 (0.95 - 1.75)	0.104
Ethnicity ($\chi^2=1.84$, $p=0.175$)				
Non-white (CA, US & EN) or non-English (AU)	22.4 (48)	Reference		
White (CA, US & EN) or English (AU)	32.2 (542)	0.36	1.43 (0.84 - 2.41)	0.186
Not stated	-	-	-	-
Education ($\chi^2=0.51$, $p=0.775$)				
Low	30.8 (215)	Reference		
Moderate	32.4 (231)	0.13	1.14 (0.79 - 1.63)	0.487
High	29.6 (144)	0.11	1.11 (0.73 - 1.69)	0.618
Not stated	-	-	-	-
Income ($\chi^2=3.9$, $p=0.273$)				
Low	28.6 (106)	Reference		
Moderate	29.7 (139)	-0.01	1.00 (0.66 - 1.49)	0.980
High	33.2 (313)	0.31	1.37 (0.93 - 2.01)	0.107
Not stated	27.0 (32)	0.01	1.01 (0.53 - 1.91)	0.985
Perceived addiction to cigarettes ($\chi^2=37.1$, $p<.001$)				
Not at all	11.6 (18)	Reference		
Yes – somewhat addicted	24.7 (172)	0.94	2.56 (1.28 - 5.12)	0.008
Yes – very addicted	39.2 (401)	1.45	4.27 (2.12 - 8.59)	<.001
Not stated	0.2 (1)	-3.98	0.02 (0.00 - 0.13)	<.001
Time in Sample ($\chi^2=6.58$, $p=0.037$)				
in 1 wave	33.3 (438)	Reference		
in 2 waves	27.0 (114)	-0.28	0.76 (0.52 - 1.11)	0.152
in 3 waves	23.9 (38)	-0.67	0.51 (0.31 - 0.85)	0.010

GEE Results – Cessation categories: Prescription pharmacological therapy

Table A14. GEE results examining any use of prescription pharmacological therapy during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=7.47$, $p=0.024$)				
Wave 1 (2016)	8.7 (170)	Reference		
Wave 2 (2018)	7.7 (127)	0.00	1.00 (0.75 - 1.34)	0.997
Wave 3 (2020)	10.3 (129)	0.47	1.60 (1.11 - 2.31)	0.012
Wave 3 (2020) vs. Wave 2 (2018)	-	0.47	1.60 (1.16 - 2.21)	0.004
Age Group ($\chi^2=12.99$, $p=0.005$)				
18-24	5.7 (59)	Reference		
25-39	9.0 (165)	0.40	1.49 (1.00 - 2.21)	0.049
40-54	10.2 (112)	0.62	1.86 (1.25 - 2.77)	0.002
55 and up	10.1 (90)	0.69	2.00 (1.29 - 3.11)	0.002
Sex ($\chi^2=0.33$, $p=0.568$)				
Female	8.2 (192)	Reference		
Male	9.4 (233)	0.08	1.08 (0.83 - 1.41)	0.568
Ethnicity ($\chi^2=0.88$, $p=0.644$)				
Non-white (CA, US & EN) or non-English (AU)	8.5 (39)	Reference		
White (CA, US & EN) or English (AU)	8.9 (382)	-0.19	0.82 (0.54 - 1.25)	0.358
Not stated	6.2 (5)	-0.35	0.71 (0.19 - 2.60)	0.600
Education ($\chi^2=2.42$, $p=0.49$)				
Low	8.8 (60)	Reference		
Moderate	8.4 (276)	0.02	1.02 (0.74 - 1.42)	0.888
High	10.2 (80)	0.25	1.28 (0.89 - 1.85)	0.182
Not stated	9.2 (10)	0.16	1.18 (0.42 - 3.31)	0.759
Income ($\chi^2=7.82$, $p=0.05$)				
Low	8.0 (77)	Reference		
Moderate	9.5 (144)	0.11	1.12 (0.76 - 1.64)	0.562
High	9.5 (191)	0.14	1.15 (0.80 - 1.66)	0.454
Not stated	3.9 (14)	-0.64	0.53 (0.26 - 1.07)	0.077
Perceived addiction to cigarettes ($\chi^2=23.97$, $p<.001$)				
Not at all	3.3 (22)	Reference		
Yes – somewhat addicted	8.9 (193)	0.87	2.39 (1.40 - 4.08)	0.001
Yes – very addicted	10.8 (206)	1.10	2.99 (1.77 - 5.06)	<.001
Not stated	5.0 (4)	0.45	1.57 (0.48 - 5.12)	0.457
Time in Sample ($\chi^2=11.15$, $p=0.004$)				
in 1 wave	9.4 (363)	Reference		
in 2 waves	6.4 (48)	-0.49	0.62 (0.41 - 0.92)	0.017
in 3 waves	6.0 (15)	-0.97	0.38 (0.17 - 0.82)	0.014

Table A15. GEE results examining any use of prescription pharmacological therapy during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,833) *

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=2.09$, $p=0.352$)				
Wave 1 (2016)	14.8 (278)	Reference		
Wave 2 (2018)	12.2 (190)	-0.18	0.83 (0.65 - 1.07)	0.157
Wave 3 (2020)	13.1 (186)	-0.16	0.85 (0.63 - 1.16)	0.312
Wave 3 (2020) vs. Wave 2 (2018)	-	0.02	1.02 (0.79 - 1.33)	0.862
Age Group ($\chi^2=38.94$, $p<.001$)				
18-24	5.5 (34)	Reference		
25-39	11.5 (176)	0.64	1.91 (1.33 - 2.73)	<.001
40-54	16.2 (232)	0.95	2.60 (1.84 - 3.66)	<.001
55 and up	16.8 (210)	0.94	2.57 (1.81 - 3.64)	<.001
Sex ($\chi^2=0.43$, $p=0.514$)				
Female	12.9 (266)	Reference		
Male	14.0 (387)	0.08	1.08 (0.86 - 1.35)	0.513
Ethnicity ($\chi^2=3.32$, $p=0.19$)				
Non-white (CA, US & EN) or non-English (AU)	10.9 (84)	Reference		
White (CA, US & EN) or English (AU)	13.8 (552)	-0.04	0.96 (0.69 - 1.35)	0.827
Not stated	21.8 (17)	0.85	2.35 (1.08 - 5.09)	0.031
Education ($\chi^2=7.1$, $p=0.069$)				
Low	12.6 (161)	Reference		
Moderate	14.9 (323)	0.18	1.20 (0.91 - 1.58)	0.198
High	12.4 (169)	0.05	1.05 (0.75 - 1.46)	0.789
Not stated	2.8 (1)	-1.55	0.21 (0.04 - 1.27)	0.089
Income ($\chi^2=4.05$, $p=0.256$)				
Low	12.3 (127)	Reference		
Moderate	15.2 (206)	0.25	1.28 (0.94 - 1.75)	0.118
High	13.4 (287)	0.14	1.15 (0.84 - 1.58)	0.37
Not stated	10.6 (32)	-0.16	0.85 (0.49 - 1.47)	0.557
Perceived addiction to cigarettes ($\chi^2=39.66$, $p<.001$)				
Not at all	5.3 (28)	Reference		
Yes – somewhat addicted	10.4 (212)	0.70	2.01 (1.22 - 3.31)	0.006
Yes – very addicted	18.3 (413)	1.20	3.33 (2.00 - 5.56)	<.001
Not stated	-	-	-	-
Time in Sample ($\chi^2=0.9$, $p=0.638$)				
in 1 wave	13.8 (456)	Reference		
in 2 waves	12.1 (136)	-0.06	0.94 (0.73 - 1.21)	0.630
in 3 waves	14.9 (61)	0.13	1.14 (0.73 - 1.77)	0.572

*Excluding respondents who did not use any PPT and did not report any feeling of perceived addiction to cigarettes (n=47)

Table A16. GEE results examining any use of prescription pharmacological therapy during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=0.49$, $p=0.784$)				
Wave 1 (2016)	14.7 (182)	Reference		
Wave 2 (2018)	15.3 (144)	-0.04	0.96 (0.67 - 1.37)	0.807
Wave 3 (2020)	17.2 (126)	0.08	1.08 (0.68 - 1.72)	0.732
Wave 3 (2020) vs. Wave 2 (2018)	-	0.13	1.13 (0.79 - 1.63)	0.496
Age Group ($\chi^2=16.86$, $p=0.001$)				
18-24	8.0 (33)	Reference		
25-39	13.3 (122)	0.37	1.45 (0.86 - 2.47)	0.168
40-54	17.4 (154)	0.67	1.95 (1.19 - 3.18)	0.008
55 and up	20.3 (144)	0.84	2.31 (1.49 - 3.60)	<.001
Sex ($\chi^2=0.11$, $p=0.741$)				
Female	14.9 (211)	Reference		
Male	16.1 (241)	0.06	1.06 (0.76 - 1.48)	0.741
Ethnicity ($\chi^2=0.01$, $p=0.926$)				
Non-white (CA, US & EN) or non-English (AU)	14.3 (113)	Reference		
White (CA, US & EN) or English (AU)	16.0 (339)	-0.02	0.98 (0.66 - 1.46)	0.926
Not stated	-	-	-	-
Education ($\chi^2=2.78$, $p=0.249$)				
Low	15.9 (228)	Reference		
Moderate	14.2 (147)	-0.20	0.82 (0.58 - 1.16)	0.268
High	17.6 (77)	0.09	1.10 (0.71 - 1.69)	0.669
Not stated	-	-	-	-
Income ($\chi^2=6.51$, $p=0.089$)				
Low	14.0 (157)	Reference		
Moderate	14.1 (119)	-0.05	0.95 (0.66 - 1.36)	0.766
High	17.6 (77)	0.32	1.38 (0.95 - 2.01)	0.093
Not stated	-	-1.64	0.19 (0.03 - 1.50)	0.115
Perceived addiction to cigarettes ($\chi^2=22.29$, $p=<.001$)				
Not at all	6.8 (30)	Reference		
Yes – somewhat addicted	14.1 (145)	0.74	2.09 (1.26 - 3.46)	0.004
Yes – very addicted	19.6 (270)	1.13	3.09 (1.85 - 5.16)	<.001
Not stated	11.2 (7)	0.58	1.79 (0.53 - 6.07)	0.352
Time in Sample ($\chi^2=5.48$, $p=0.065$)				
in 1 wave	14.2 (288)	Reference		
in 2 waves	18.9 (127)	0.42	1.52 (1.06 - 2.19)	0.023
in 3 waves	17.2 (37)	-0.01	0.99 (0.46 - 2.14)	0.971

Table A17. GEE results examining any use of prescription pharmacological therapy during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=2.56$, $p=0.278$)				
Wave 1 (2016)	18.7 (149)	Reference		
Wave 2 (2018)	14.9 (86)	-0.38	0.69 (0.43 - 1.11)	0.122
Wave 3 (2020)	14.7 (77)	-0.17	0.85 (0.53 - 1.34)	0.477
Wave 3 (2020) vs. Wave 2 (2018)	-	0.21	1.23 (0.75 - 2.03)	0.417
Age Group ($\chi^2=8.48$, $p=0.037$)				
18-24	6.9 (18)	Reference		
25-39	15.9 (119)	0.92	2.51 (0.79 - 7.96)	0.119
40-54	18.6 (88)	1.00	2.71 (0.87 - 8.40)	0.084
55 and up	21.2 (86)	1.17	3.22 (1.03 - 10.08)	0.045
Sex ($\chi^2=0.17$, $p=0.681$)				
Female	15.9 (139)	Reference		
Male	16.9 (173)	0.08	1.08 (0.76 - 1.54)	0.678
Ethnicity ($\chi^2=3.58$, $p=0.058$)				
Non-white (CA, US & EN) or non-English (AU)	9.7 (21)	Reference		
White (CA, US & EN) or English (AU)	17.3 (292)	0.55	1.74 (0.95 - 3.17)	0.074
Not stated	-	-	-	-
Education ($\chi^2=3.09$, $p=0.213$)				
Low	17.3 (121)	Reference		
Moderate	14.7 (105)	-0.16	0.85 (0.57 - 1.26)	0.421
High	17.9 (87)	0.27	1.30 (0.78 - 2.17)	0.307
Not stated	-	-	-	-
Income ($\chi^2=1.48$, $p=0.687$)				
Low	15.6 (58)	Reference		
Moderate	17.3 (81)	0.19	1.22 (0.75 - 1.98)	0.434
High	15.7 (148)	0.01	1.01 (0.66 - 1.55)	0.949
Not stated	21.7 (25)	0.39	1.48 (0.67 - 3.29)	0.335
Perceived addiction to cigarettes ($\chi^2=13.47$, $p<.001$)				
Not at all	6.8 (10)	Reference		
Yes – somewhat addicted	11.9 (83)	0.74	2.10 (0.77 - 5.75)	0.149
Yes – very addicted	21.0 (215)	1.27	3.56 (1.31 - 9.65)	0.013
Not stated	15.2 (4)	1.05	2.85 (0.64 - 12.82)	0.171
Time in Sample ($\chi^2=1.81$, $p=0.405$)				
in 1 wave	17.3 (228)	Reference		
in 2 waves	15.6 (66)	0.01	1.01 (0.62 - 1.66)	0.964
in 3 waves	11.4 (18)	-0.38	0.68 (0.38 - 1.24)	0.210

GEE Results – Cessation categories: Telephone/quitline

Table A18. GEE results examining any use of telephone/quitline services during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=5.1$, $p=0.078$)				
Wave 1 (2016)	2.6 (51)	Reference		
Wave 2 (2018)	2.0 (33)	-0.09	0.92 (0.55 - 1.54)	0.744
Wave 3 (2020)	4.1 (51)	0.58	1.78 (1.04 - 3.04)	0.035
Wave 3 (2020) vs. Wave 2 (2018)	-	0.66	1.94 (1.14 - 3.30)	0.015
Age Group ($\chi^2=17.09$, $p=0.001$)				
18-24	4.3 (44)	Reference		
25-39	3.5 (64)	-0.25	0.78 (0.47 - 1.31)	0.350
40-54	1.6 (17)	-0.93	0.40 (0.20 - 0.78)	0.007
55 and up	1.1 (10)	-1.18	0.31 (0.15 - 0.63)	0.001
Sex ($\chi^2=6.31$, $p=0.012$)				
Female	1.8 (43)	Reference		
Male	3.7 (92)	0.58	1.78 (1.13 - 2.79)	0.013
Ethnicity ($\chi^2=1.6$, $p=0.45$)				
Non-white (CA, US & EN) or non-English (AU)	5.1 (23)	Reference		
White (CA, US & EN) or English (AU)	2.5 (109)	-0.43	0.65 (0.35 - 1.19)	0.162
Not stated	4.3 (4)	-0.18	0.84 (0.19 - 3.66)	0.816
Education ($\chi^2=10.59$, $p=0.014$)				
Low	1.4 (10)	Reference		
Moderate	2.5 (82)	0.10	1.10 (0.58 - 2.09)	0.767
High	4.9 (38)	0.83	2.29 (1.19 - 4.39)	0.013
Not stated	4.6 (5)	0.66	1.93 (0.44 - 8.56)	0.385
Income ($\chi^2=14.32$, $p=0.003$)				
Low	1.1 (10)	Reference		
Moderate	2.9 (44)	1.05	2.86 (1.40 - 5.84)	0.004
High	3.5 (71)	1.01	2.76 (1.41 - 5.41)	0.003
Not stated	2.9 (10)	0.83	2.30 (0.86 - 6.13)	0.097
Perceived addiction to cigarettes ($\chi^2=3.47$, $p=0.324$)				
Not at all	2.2 (15)	Reference		
Yes – somewhat addicted	3.1 (67)	0.47	1.60 (0.79 - 3.26)	0.192
Yes – very addicted	2.7 (51)	0.58	1.78 (0.86 - 3.68)	0.12
Not stated	3.2 (3)	0.66	1.93 (0.38 - 9.72)	0.426
Time in Sample ($\chi^2=10.39$, $p=0.006$)				
in 1 wave	3.3 (126)	Reference		
in 2 waves	0.8 (6)	-1.06	0.35 (0.16 - 0.76)	0.008
in 3 waves	1.3 (3)	-1.03	0.36 (0.10 - 1.32)	0.123

Table A19. GEE results examining any use of telephone/quitline services during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=4.21$, $p=0.122$)				
Wave 1 (2016)	2.1 (40)	Reference		
Wave 2 (2018)	2.1 (33)	0.11	1.12 (0.59 - 2.13)	0.725
Wave 3 (2020)	3.1 (44)	0.61	1.83 (1.08 - 3.11)	0.025
Wave 3 (2020) vs. Wave 2 (2018)	-	0.49	1.64 (0.87 - 3.06)	0.125
Age Group ($\chi^2=0.08$, $p=0.995$)				
18-24	2.4 (15)	Reference		
25-39	2.6 (40)	0.06	1.07 (0.59 - 1.93)	0.833
40-54	2.4 (34)	0.02	1.02 (0.57 - 1.82)	0.952
55 and up	2.3 (28)	-0.01	0.99 (0.52 - 1.87)	0.971
Sex ($\chi^2=0.03$, $p=0.874$)				
Female	2.5 (51)	Reference		
Male	2.4 (66)	-0.04	0.97 (0.63 - 1.49)	0.874
Ethnicity ($\chi^2=1.33$, $p=0.515$)				
Non-white (CA, US & EN) or non-English (AU)	3.2 (25)	Reference		
White (CA, US & EN) or English (AU)	2.3 (90)	-0.32	0.72 (0.43 - 1.21)	0.214
Not stated	2.8 (2)	-0.37	0.69 (0.10 - 4.89)	0.711
Education ($\chi^2=2.08$, $p=0.556$)				
Low	2.5 (32)	Reference		
Moderate	2.0 (44)	-0.20	0.82 (0.46 - 1.45)	0.498
High	2.8 (39)	0.12	1.13 (0.61 - 2.12)	0.697
Not stated	7.2 (2)	1.20	3.33 (0.44 - 25.41)	0.246
Income ($\chi^2=0.45$, $p=0.93$)				
Low	2.6 (27)	Reference		
Moderate	2.1 (29)	-0.18	0.84 (0.46 - 1.52)	0.564
High	2.5 (54)	-0.01	0.99 (0.57 - 1.72)	0.967
Not stated	2.5 (8)	-0.04	0.96 (0.32 - 2.91)	0.937
Perceived addiction to cigarettes ($\chi^2=2.18$, $p=0.536$)				
Not at all	1.9 (10)	Reference		
Yes – somewhat addicted	2.2 (45)	0.17	1.19 (0.48 - 2.95)	0.708
Yes – very addicted	2.7 (61)	0.47	1.60 (0.64 - 3.99)	0.313
Not stated	2.9 (1)	0.43	1.53 (0.23 - 10.12)	0.657
Time in Sample ($\chi^2=4.2$, $p=0.122$)				
in 1 wave	2.6 (86)	Reference		
in 2 waves	2.1 (24)	-0.27	0.77 (0.39 - 1.49)	0.435
in 3 waves	1.7 (7)	-0.86	0.42 (0.16 - 1.14)	0.088

Table A20. GEE results examining any use of telephone/quitline services during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,896) *

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=0.92$, $p=0.63$)				
Wave 1 (2016)	4.5 (55)	Reference		
Wave 2 (2018)	4.9 (46)	-0.24	0.79 (0.44 - 1.41)	0.419
Wave 3 (2020)	4.3 (31)	-0.33	0.72 (0.34 - 1.54)	0.395
Wave 3 (2020) vs. Wave 2 (2018)	-	-0.09	0.91 (0.47 - 1.79)	0.791
Age Group ($\chi^2=2.17$, $p=0.538$)				
18-24	4.2 (17)	Reference		
25-39	3.6 (32)	-0.29	0.75 (0.39 - 1.42)	0.376
40-54	6.0 (53)	0.22	1.24 (0.64 - 2.40)	0.521
55 and up	4.3 (31)	-0.1	0.91 (0.48 - 1.71)	0.766
Sex ($\chi^2=0.27$, $p=0.603$)				
Female	4.9 (69)	Reference		
Male	4.3 (64)	-0.14	0.87 (0.52 - 1.47)	0.605
Ethnicity ($\chi^2=7.33$, $p=0.007$)				
Non-white (CA, US & EN) or non-English (AU)	7.4 (58)	Reference		
White (CA, US & EN) or English (AU)	3.6 (75)	-0.93	0.40 (0.23 - 0.68)	0.001
Not stated	-	-	-	-
Education ($\chi^2=3.54$, $p=0.17$)				
Low	3.9 (56)	Reference		
Moderate	5.2 (53)	0.26	1.30 (0.70 - 2.43)	0.407
High	5.6 (24)	0.65	1.91 (0.97 - 3.76)	0.063
Not stated	-	-	-	-
Income ($\chi^2=0.56$, $p=0.757$)				
Low	5.1 (57)	Reference		
Moderate	4.0 (34)	-0.21	0.81 (0.44 - 1.48)	0.492
High	4.5 (42)	-0.16	0.86 (0.46 - 1.58)	0.619
Not stated	-	-	-	-
Perceived addiction to cigarettes ($\chi^2=12.78$, $p=0.005$)				
Not at all	2.0 (9)	Reference		
Yes – somewhat addicted	3.9 (40)	0.86	2.36 (1.04 - 5.40)	0.041
Yes – very addicted	5.5 (75)	1.28	3.58 (1.56 - 8.21)	0.003
Not stated	15.3 (9)	2.54	12.66 (2.69 - 59.55)	0.001
Time in Sample ($\chi^2=3.1$, $p=0.213$)				
in 1 wave	4.2 (85)	Reference		
in 2 waves	6.2 (41)	0.61	1.85 (0.94 - 3.62)	0.075
in 3 waves	3.0 (6)	-0.01	0.99 (0.31 - 3.17)	0.987

*Excluding respondents who did not use telephone/quitline services and did not report level of income (n=16)

Table A21. GEE results examining any use of telephone/quitline services during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=1.48$, $p=0.476$)				
Wave 1 (2016)	4.9 (39)	Reference		
Wave 2 (2018)	3.8 (22)	-0.02	0.98 (0.39 - 2.43)	0.960
Wave 3 (2020)	5.3 (28)	0.47	1.60 (0.77 - 3.31)	0.210
Wave 3 (2020) vs. Wave 2 (2018)	-	0.49	1.63 (0.66 - 4.08)	0.293
Age Group ($\chi^2=1.92$, $p=0.59$)				
18-24	3.7 (10)	Reference		
25-39	4.5 (33)	0.02	1.02 (0.21 - 4.93)	0.976
40-54	6.0 (29)	0.33	1.39 (0.31 - 6.31)	0.672
55 and up	4.0 (16)	-0.11	0.89 (0.20 - 4.08)	0.885
Sex ($\chi^2=0.58$, $p=0.448$)				
Female	4.0 (35)	Reference		
Male	5.2 (53)	0.23	1.26 (0.70 - 2.27)	0.439
Ethnicity ($\chi^2=0.48$, $p=0.488$)				
Non-white (CA, US & EN) or non-English (AU)	6.2 (13)	Reference		
White (CA, US & EN) or English (AU)	4.5 (75)	-0.34	0.71 (0.28 - 1.79)	0.466
Not stated	-	-	-	-
Education ($\chi^2=0.36$, $p=0.837$)				
Low	4.8 (34)	Reference		
Moderate	4.1 (30)	-0.18	0.84 (0.41 - 1.69)	0.616
High	5.2 (25)	0.03	1.03 (0.39 - 2.74)	0.956
Not stated	-	-	-	-
Income ($\chi^2=16.23$, $p=0.001$)				
Low	4.9 (18)	Reference		
Moderate	4.4 (21)	-0.25	0.78 (0.34 - 1.77)	0.554
High	5.2 (49)	-0.09	0.91 (0.46 - 1.80)	0.787
Not stated	0.3 (0)	-2.94	0.05 (0.01 - 0.51)	0.011
Perceived addiction to cigarettes ($\chi^2=12.01$, $p=0.007$)				
Not at all	3.0 (5)	Reference		
Yes – somewhat addicted	3.1 (22)	-0.04	0.96 (0.18 - 5.24)	0.963
Yes – very addicted	6.1 (62)	0.67	1.95 (0.36 - 10.46)	0.436
Not stated	0.4 (0)	-2.16	0.12 (0.01 - 1.61)	0.109
Time in Sample ($\chi^2=6.75$, $p=0.034$)				
in 1 wave	5.5 (72)	Reference		
in 2 waves	3.2 (14)	-0.5	0.61 (0.22 - 1.66)	0.331
in 3 waves	1.8 (3)	-1.50	0.22 (0.07 - 0.71)	0.011

GEE Results – Cessation categories: Counselling services

Table A22. GEE results examining any use of counselling services during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=3.24$, $p=0.198$)				
Wave 1 (2016)	14.7 (287)	Reference		
Wave 2 (2018)	12.3 (203)	-0.01	0.99 (0.74 - 1.34)	0.965
Wave 3 (2020)	10.2 (127)	-0.26	0.77 (0.56 - 1.05)	0.101
Wave 3 (2020) vs. Wave 2 (2018)	-	-0.26	0.77 (0.55 - 1.09)	0.139
Age Group ($\chi^2=3.67$, $p=0.299$)				
18-24	12.4 (127)	Reference		
25-39	11.8 (216)	-0.06	0.94 (0.67 - 1.32)	0.713
40-54	13.5 (148)	0.15	1.16 (0.83 - 1.62)	0.396
55 and up	14.1 (127)	0.23	1.26 (0.89 - 1.79)	0.198
Sex ($\chi^2=0.36$, $p=0.55$)				
Female	12.3 (290)	Reference		
Male	13.2 (327)	0.07	1.07 (0.85 - 1.35)	0.549
Ethnicity ($\chi^2=4.66$, $p=0.097$)				
Non-white (CA, US & EN) or non-English (AU)	16.3 (74)	Reference		
White (CA, US & EN) or English (AU)	12.3 (529)	-0.45	0.64 (0.44 - 0.94)	0.023
Not stated	17.0 (15)	-0.09	0.91 (0.39 - 2.13)	0.830
Education ($\chi^2=2.75$, $p=0.431$)				
Low	12.1 (83)	Reference		
Moderate	13.1 (429)	0.16	1.17 (0.89 - 1.54)	0.258
High	11.0 (86)	-0.01	0.99 (0.73 - 1.35)	0.939
Not stated	17.1 (19)	0.47	1.60 (0.72 - 3.55)	0.247
Income ($\chi^2=0.78$, $p=0.854$)				
Low	13.3 (127)	Reference		
Moderate	12.4 (188)	-0.05	0.95 (0.69 - 1.31)	0.751
High	12.9 (260)	0.00	1.00 (0.73 - 1.37)	1.000
Not stated	11.7 (42)	-0.21	0.81 (0.47 - 1.40)	0.452
Perceived addiction to cigarettes ($\chi^2=18.09$, $p<.001$)				
Not at all	7.2 (50)	Reference		
Yes – somewhat addicted	12.1 (262)	0.51	1.66 (1.11 - 2.50)	0.015
Yes – very addicted	15.5 (296)	0.80	2.23 (1.47 - 3.38)	<.001
Not stated	10.9 (9)	0.42	1.53 (0.59 - 3.93)	0.379
Time in Sample ($\chi^2=12.93$, $p=0.002$)				
in 1 wave	14.1 (544)	Reference		
in 2 waves	7.3 (55)	-0.69	0.50 (0.34 - 0.75)	0.001
in 3 waves	7.5 (19)	-0.49	0.61 (0.33 - 1.12)	0.109

Table A23. GEE results examining any use of counselling services during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=34.79$, $p<.001$)				
Wave 1 (2016)	13.4 (253)	Reference		
Wave 2 (2018)	11.6 (182)	-0.11	0.90 (0.68 - 1.19)	0.456
Wave 3 (2020)	5.9 (84)	-0.89	0.41 (0.28 - 0.60)	<.001
Wave 3 (2020) vs. Wave 2 (2018)	-	-0.78	0.46 (0.33 - 0.65)	<.001
Age Group ($\chi^2=2.61$, $p=0.456$)				
18-24	10.3 (64)	Reference		
25-39	10.1 (156)	0.01	1.01 (0.74 - 1.39)	0.947
40-54	10.4 (150)	0.13	1.14 (0.83 - 1.56)	0.432
55 and up	11.7 (148)	0.25	1.29 (0.92 - 1.81)	0.141
Sex ($\chi^2=0.24$, $p=0.621$)				
Female	10.2 (211)	Reference		
Male	11.0 (307)	0.06	1.06 (0.84 - 1.33)	0.621
Ethnicity ($\chi^2=10.79$, $p=0.005$)				
Non-white (CA, US & EN) or non-English (AU)	15.7 (124)	Reference		
White (CA, US & EN) or English (AU)	9.6 (384)	-0.52	0.60 (0.45 - 0.79)	<.001
Not stated	12.7 (10)	-0.21	0.81 (0.34 - 1.96)	0.642
Education ($\chi^2=11.15$, $p=0.011$)				
Low	8.9 (115)	Reference		
Moderate	10.0 (219)	0.20	1.22 (0.91 - 1.65)	0.191
High	13.2 (182)	0.57	1.77 (1.25 - 2.49)	0.001
Not stated	7.9 (2)	-0.12	0.89 (0.25 - 3.13)	0.854
Income ($\chi^2=15.04$, $p=0.002$)				
Low	11.6 (121)	Reference		
Moderate	13.5 (184)	0.04	1.04 (0.77 - 1.41)	0.778
High	8.5 (183)	-0.50	0.60 (0.44 - 0.84)	0.002
Not stated	10.0 (31)	-0.23	0.80 (0.50 - 1.29)	0.354
Perceived addiction to cigarettes ($\chi^2=5.29$, $p=0.152$)				
Not at all	8.4 (45)	Reference		
Yes – somewhat addicted	11.1 (227)	0.27	1.31 (0.87 - 1.98)	0.195
Yes – very addicted	10.3 (234)	0.24	1.28 (0.84 - 1.94)	0.256
Not stated	29.4 (13)	1.37	3.92 (1.69 - 9.11)	0.002
Time in Sample ($\chi^2=1.2$, $p=0.548$)				
in 1 wave	11.7 (391)	Reference		
in 2 waves	9.2 (104)	-0.16	0.85 (0.63 - 1.15)	0.298
in 3 waves	5.7 (24)	-0.20	0.82 (0.42 - 1.61)	0.566

Table A24. GEE results examining any use of counselling services during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=21.81$, $p<.001$)				
Wave 1 (2016)	11.1 (137)	Reference		
Wave 2 (2018)	10.1 (95)	-0.40	0.67 (0.45 – 1.00)	0.049
Wave 3 (2020)	4.5 (33)	-1.29	0.27 (0.15 - 0.50)	<.001
Wave 3 (2020) vs. Wave 2 (2018)	-	-0.89	0.41 (0.24 - 0.70)	0.001
Age Group ($\chi^2=8.37$, $p=0.039$)				
18-24	10.6 (43)	Reference		
25-39	8.2 (75)	-0.41	0.66 (0.39 - 1.12)	0.124
40-54	7.3 (65)	-0.57	0.57 (0.34 - 0.95)	0.032
55 and up	11.7 (82)	-0.01	0.99 (0.65 - 1.49)	0.947
Sex ($\chi^2=0.13$, $p=0.714$)				
Female	9.5 (135)	Reference		
Male	8.7 (130)	-0.07	0.93 (0.64 - 1.36)	0.713
Ethnicity ($\chi^2=6.19$, $p=0.013$)				
Non-white (CA, US & EN) or non-English (AU)	11.5 (91)	Reference		
White (CA, US & EN) or English (AU)	8.2 (174)	-0.63	0.53 (0.35 - 0.83)	0.005
Not stated	-	-	-	-
Education ($\chi^2=3.56$, $p=0.169$)				
Low	8.2 (118)	Reference		
Moderate	9.6 (99)	0.14	1.16 (0.76 - 1.76)	0.506
High	10.9 (48)	0.45	1.57 (0.96 - 2.57)	0.073
Not stated	-	-	-	-
Income ($\chi^2=4.2$, $p=0.241$)				
Low	9.3 (105)	Reference		
Moderate	7.8 (66)	-0.19	0.83 (0.54 - 1.26)	0.377
High	10.9 (48)	0.17	1.18 (0.76 - 1.84)	0.456
Not stated	-	-1.62	0.20 (0.02 – 1.87)	0.158
Perceived addiction to cigarettes ($\chi^2=14.43$, $p=0.002$)				
Not at all	5.0 (22)	Reference		
Yes – somewhat addicted	7.9 (81)	0.56	1.75 (1.00 - 3.06)	0.051
Yes – very addicted	11.3 (156)	1.03	2.80 (1.58 - 4.94)	<.001
Not stated	8.6 (5)	0.84	2.31 (0.61 - 8.72)	0.215
Time in Sample ($\chi^2=4.61$, $p=0.1$)				
in 1 wave	9.2 (186)	Reference		
in 2 waves	10.4 (70)	0.62	1.86 (1.11 - 3.10)	0.018
in 3 waves	4.2 (9)	0.37	1.44 (0.49 - 4.21)	0.503

Table A25. GEE results examining any use of counselling services during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=4.66$, $p=0.097$)				
Wave 1 (2016)	9.3 (74)	Reference		
Wave 2 (2018)	10.8 (62)	0.28	1.32 (0.68 - 2.56)	0.405
Wave 3 (2020)	4.6 (24)	-0.57	0.57 (0.27 - 1.21)	0.143
Wave 3 (2020) vs. Wave 2 (2018)	-	-0.85	0.43 (0.18 - 1.02)	0.055
Age Group ($\chi^2=6.13$, $p=0.105$)				
18-24	8.3 (22)	Reference		
25-39	8.7 (65)	-0.03	0.97 (0.35 - 2.72)	0.959
40-54	6.1 (29)	-0.32	0.73 (0.27 - 1.95)	0.530
55 and up	10.8 (44)	0.29	1.33 (0.5 - 3.52)	0.563
Sex ($\chi^2=2.4$, $p=0.121$)				
Female	6.9 (60)	Reference		
Male	9.8 (100)	0.39	1.48 (0.91 - 2.41)	0.118
Ethnicity ($\chi^2=0.7$, $p=0.402$)				
Non-white (CA, US & EN) or non-English (AU)	12.2 (26)	Reference		
White (CA, US & EN) or English (AU)	8.0 (134)	-0.36	0.70 (0.32 - 1.51)	0.362
Not stated	-	-	-	-
Education ($\chi^2=9.39$, $p=0.009$)				
Low	6.5 (45)	Reference		
Moderate	7.1 (51)	0.18	1.20 (0.64 - 2.25)	0.581
High	13.2 (64)	0.94	2.55 (1.41 - 4.62)	0.002
Not stated	-	-	-	-
Income ($\chi^2=3.78$, $p=0.286$)				
Low	10.8 (40)	Reference		
Moderate	7 (33)	-0.74	0.48 (0.22 - 1.02)	0.056
High	8.4 (79)	-0.69	0.5 (0.27 - 0.93)	0.029
Not stated	7.1 (8)	-0.59	0.56 (0.11 - 2.8)	0.476
Perceived addiction to cigarettes ($\chi^2=7.16$, $p=0.067$)				
Not at all	4.2 (6)	Reference		
Yes – somewhat addicted	7.3 (51)	0.61	1.83 (0.58 - 5.83)	0.304
Yes – very addicted	10.0 (102)	1.05	2.85 (0.93 - 8.72)	0.066
Not stated	4.8 (1)	0.10	1.11 (0.10 - 12.04)	0.934
Time in Sample ($\chi^2=4.08$, $p=0.13$)				
in 1 wave	9.2 (121)	Reference		
in 2 waves	8.6 (36)	-0.21	0.81 (0.37 - 1.78)	0.598
in 3 waves	1.8 (3)	-1.41	0.25 (0.05 - 1.21)	0.084

GEE Results – Cessation categories: Self-help services

Table A26. GEE results examining any use of self-help services during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=12.34$, $p=0.002$)				
Wave 1 (2016)	17.5 (341)	Reference		
Wave 2 (2018)	16.7 (275)	0.06	1.07 (0.82 - 1.39)	0.633
Wave 3 (2020)	23.7 (296)	0.50	1.65 (1.25 - 2.18)	0.001
Wave 3 (2020) vs. Wave 2 (2018)	-	0.44	1.55 (1.16 - 2.06)	0.003
Age Group ($\chi^2=48.31$, $p<.001$)				
18-24	28.9 (295)	Reference		
25-39	19.7 (361)	-0.50	0.61 (0.46 - 0.80)	<.001
40-54	14.6 (160)	-0.82	0.44 (0.33 - 0.59)	<.001
55 and up	10.7 (96)	-1.07	0.34 (0.24 - 0.48)	<.001
Sex ($\chi^2=3.62$, $p=0.057$)				
Female	16.6 (392)	Reference		
Male	20.9 (520)	0.21	1.23 (1 - 1.52)	0.056
Ethnicity ($\chi^2=6.95$, $p=0.031$)				
Non-white (CA, US & EN) or non-English (AU)	27.7 (126)	Reference		
White (CA, US & EN) or English (AU)	17.5 (754)	-0.29	0.75 (0.53 - 1.06)	0.100
Not stated	37.6 (32)	0.71	2.04 (0.95 - 4.38)	0.068
Education ($\chi^2=18.88$, $p<.001$)				
Low	13.3 (91)	Reference		
Moderate	18.7 (612)	0.06	1.06 (0.80 - 1.41)	0.680
High	25.0 (196)	0.49	1.64 (1.20 - 2.24)	0.002
Not stated	11.4 (13)	-0.67	0.51 (0.21 - 1.25)	0.14
Income ($\chi^2=3.71$, $p=0.295$)				
Low	16.7 (160)	Reference		
Moderate	16.5 (249)	0.03	1.03 (0.75 - 1.40)	0.869
High	21.8 (440)	0.21	1.24 (0.93 - 1.66)	0.147
Not stated	17.4 (62)	-0.09	0.92 (0.56 - 1.51)	0.735
Perceived addiction to cigarettes ($\chi^2=7.49$, $p=0.058$)				
Not at all	16.5 (114)	Reference		
Yes – somewhat addicted	20.3 (439)	0.38	1.46 (1.07 - 2.00)	0.019
Yes – very addicted	18.1 (344)	0.42	1.52 (1.09 - 2.12)	0.014
Not stated	16.8 (14)	0.42	1.52 (0.63 - 3.69)	0.351
Time in Sample ($\chi^2=10.79$, $p=0.005$)				
in 1 wave	20.7 (796)	Reference		
in 2 waves	11.4 (85)	-0.49	0.62 (0.44 - 0.87)	0.006
in 3 waves	12.4 (31)	-0.60	0.55 (0.32 - 0.96)	0.036

Table A27. GEE results examining any use of self-help services during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=3.13$, $p=0.209$)				
Wave 1 (2016)	21.6 (408)	Reference		
Wave 2 (2018)	17.4 (273)	-0.20	0.82 (0.66 - 1.03)	0.087
Wave 3 (2020)	19.3 (274)	-0.06	0.94 (0.73 - 1.21)	0.625
Wave 3 (2020) vs. Wave 2 (2018)	-	0.13	1.14 (0.90 - 1.45)	0.274
Age Group ($\chi^2=45.23$, $p<.001$)				
18-24	29.0 (182)	Reference		
25-39	21.3 (330)	-0.42	0.66 (0.52 - 0.83)	0.001
40-54	19.7 (284)	-0.50	0.61 (0.48 - 0.78)	<.001
55 and up	12.7 (160)	-0.93	0.39 (0.30 - 0.52)	<.001
Sex ($\chi^2=12.51$, $p<.001$)				
Female	22.4 (465)	Reference		
Male	17.5 (490)	-0.33	0.72 (0.60 - 0.86)	<.001
Ethnicity ($\chi^2=15.02$, $p=0.001$)				
Non-white (CA, US & EN) or non-English (AU)	28.6 (227)	Reference		
White (CA, US & EN) or English (AU)	18.0 (720)	-0.40	0.67 (0.53 - 0.85)	0.001
Not stated	10.8 (9)	-1.08	0.34 (0.15 - 0.76)	0.008
Education ($\chi^2=10.59$, $p=0.014$)				
Low	17.2 (221)	Reference		
Moderate	18.5 (403)	0.17	1.18 (0.94 - 1.50)	0.158
High	23.7 (327)	0.43	1.54 (1.18 - 2.01)	0.001
Not stated	14.9 (4)	0.08	1.08 (0.31 - 3.73)	0.903
Income ($\chi^2=1.33$, $p=0.723$)				
Low	19.9 (207)	Reference		
Moderate	19.1 (261)	0.02	1.02 (0.80 - 1.30)	0.874
High	20.2 (436)	0.08	1.08 (0.85 - 1.38)	0.507
Not stated	16.6 (51)	-0.12	0.88 (0.60 - 1.30)	0.529
Perceived addiction to cigarettes ($\chi^2=4.49$, $p=0.213$)				
Not at all	19.3 (105)	Reference		
Yes – somewhat addicted	20.8 (425)	0.18	1.19 (0.89 - 1.60)	0.236
Yes – very addicted	18.2 (410)	0.18	1.19 (0.88 - 1.62)	0.257
Not stated	37.4 (16)	0.95	2.59 (1.21 - 5.53)	0.014
Time in Sample ($\chi^2=1.01$, $p=0.604$)				
in 1 wave	20.9 (695)	Reference		
in 2 waves	16.9 (193)	-0.08	0.92 (0.73 - 1.16)	0.477
in 3 waves	16.5 (68)	-0.16	0.85 (0.59 - 1.23)	0.383

Table A28. GEE results examining any use of self-help services during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=5.07$, $p=0.079$)				
Wave 1 (2016)	13.7 (170)	Reference		
Wave 2 (2018)	9.2 (87)	-0.36	0.70 (0.49 – 1.00)	0.050
Wave 3 (2020)	11.7 (85)	-0.01	0.99 (0.62 – 1.57)	0.968
Wave 3 (2020) vs. Wave 2 (2018)	-	0.35	1.42 (0.92 – 2.20)	0.116
Age Group ($\chi^2=37.07$, $p<.001$)				
18-24	24.4 (99)	Reference		
25-39	9.8 (89)	-1.23	0.29 (0.19 – 0.46)	<.001
40-54	10.3 (91)	-1.16	0.31 (0.20 – 0.50)	<.001
55 and up	8.9 (63)	-1.30	0.27 (0.18 – 0.42)	<.001
Sex ($\chi^2=2.13$, $p=0.145$)				
Female	11.0 (157)	Reference		
Male	12.5 (186)	0.25	1.28 (0.92 – 1.79)	0.148
Ethnicity ($\chi^2=5.24$, $p=0.022$)				
Non-white (CA, US & EN) or non-English (AU)	15.3 (121)	Reference		
White (CA, US & EN) or English (AU)	10.5 (222)	-0.46	0.63 (0.44 – 0.91)	0.014
Not stated	-	-	-	-
Education ($\chi^2=13.99$, $p=0.001$)				
Low	9.9 (142)	Reference		
Moderate	11.8 (122)	0.19	1.21 (0.83 – 1.76)	0.333
High	18.0 (79)	0.82	2.28 (1.46 – 3.54)	<.001
Not stated	-	-	-	-
Income ($\chi^2=2.6$, $p=0.457$)				
Low	11.8 (133)	Reference		
Moderate	9.9 (83)	-0.18	0.83 (0.55 – 1.26)	0.384
High	18 (79)	0.12	1.12 (0.74 – 1.71)	0.589
Not stated	-	1.30	3.66 (0.51 – 26.55)	0.199
Perceived addiction to cigarettes ($\chi^2=11.46$, $p=0.01$)				
Not at all	8.1 (36)	Reference		
Yes – somewhat addicted	12.4 (127)	0.56	1.76 (1.05 – 2.94)	0.032
Yes – very addicted	12.7 (176)	0.82	2.28 (1.35 – 3.86)	0.002
Not stated	6.7 (4)	0.22	1.24 (0.27 – 5.76)	0.781
Time in Sample ($\chi^2=2.46$, $p=0.292$)				
in 1 wave	13.3 (270)	Reference		
in 2 waves	8.7 (58)	-0.14	0.87 (0.53 – 1.43)	0.578
in 3 waves	6.8 (15)	-0.58	0.56 (0.26 – 1.21)	0.139

Table A29. GEE results examining any use of self-help services during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=6.71$, $p=0.035$)				
Wave 1 (2016)	14.2 (113)	Reference		
Wave 2 (2018)	13.7 (79)	0.47	1.61 (0.95 - 2.73)	0.078
Wave 3 (2020)	18.4 (96)	0.70	2.01 (1.2 - 3.37)	0.008
Wave 3 (2020) vs. Wave 2 (2018)	-	0.23	1.25 (0.71 - 2.2)	0.435
Age Group ($\chi^2=7.25$, $p=0.064$)				
18-24	20.7 (55)	Reference		
25-39	17 (127)	-0.29	0.75 (0.37 - 1.52)	0.420
40-54	14 (66)	-0.46	0.63 (0.32 - 1.26)	0.193
55 and up	9.8 (40)	-0.84	0.43 (0.21 - 0.89)	0.022
Sex ($\chi^2=6.23$, $p=0.013$)				
Female	18.3 (160)	Reference		
Male	12.6 (129)	-0.52	0.6 (0.4 - 0.88)	0.010
Ethnicity ($\chi^2=0.61$, $p=0.433$)				
Non-white (CA, US & EN) or non-English (AU)	23.9 (51)	Reference		
White (CA, US & EN) or English (AU)	14.1 (238)	-0.28	0.76 (0.4 - 1.43)	0.394
Not stated	-	-	-	-
Education ($\chi^2=8.61$, $p=0.014$)				
Low	11.9 (83)	Reference		
Moderate	13.5 (96)	0.05	1.05 (0.63 - 1.74)	0.855
High	22.6 (110)	0.75	2.11 (1.23 - 3.63)	0.007
Not stated	-	-	-	-
Income ($\chi^2=1.24$, $p=0.743$)				
Low	15.5 (58)	Reference		
Moderate	12.1 (56)	-0.35	0.71 (0.38 - 1.33)	0.280
High	16.6 (156)	-0.26	0.78 (0.46 - 1.31)	0.338
Not stated	16 (19)	-0.19	0.83 (0.3 - 2.29)	0.712
Perceived addiction to cigarettes ($\chi^2=6.21$, $p=0.102$)				
Not at all	8.8 (13)	Reference		
Yes – somewhat addicted	14.4 (100)	0.48	1.62 (0.63 - 4.15)	0.317
Yes – very addicted	17 (174)	0.84	2.31 (0.91 - 5.88)	0.080
Not stated	7.4 (2)	-0.08	0.93 (0.14 - 6.15)	0.936
Time in Sample ($\chi^2=15.2$, $p=0.001$)				
in 1 wave	17.8 (234)	Reference		
in 2 waves	8.2 (35)	-1.14	0.32 (0.18 - 0.59)	<.001
in 3 waves	12.6 (20)	-0.86	0.42 (0.18 - 0.97)	0.043

GEE Results – Effective cessation assistance (excl. e-cigarettes)

Table A30. GEE results examining any use of effective cessation assistance (excl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=3.29$, $p=0.193$)				
Wave 1 (2016)	39.9 (777)	Reference		
Wave 2 (2018)	35.4 (582)	-0.09	0.92 (0.74 - 1.14)	0.422
Wave 3 (2020)	38.8 (485)	0.15	1.16 (0.91 - 1.48)	0.236
Wave 3 (2020) vs. Wave 2 (2018)	-	0.24	1.27 (0.98 - 1.64)	0.070
Age Group ($\chi^2=9.46$, $p=0.024$)				
18-24	34.3 (350)	Reference		
25-39	35.8 (656)	-0.06	0.95 (0.74 - 1.21)	0.649
40-54	42.6 (467)	0.25	1.28 (1.00 - 1.64)	0.049
55 and up	41.3 (371)	0.23	1.25 (0.97 - 1.62)	0.085
Sex ($\chi^2=1.69$, $p=0.193$)				
Female	36.7 (867)	Reference		
Male	39.3 (977)	0.11	1.12 (0.95 - 1.33)	0.189
Ethnicity ($\chi^2=2.59$, $p=0.274$)				
Non-white (CA, US & EN) or non-English (AU)	38.8 (175)	Reference		
White (CA, US & EN) or English (AU)	38.1 (1641)	-0.24	0.79 (0.58 - 1.08)	0.136
Not stated	31.8 (27)	-0.42	0.66 (0.33 - 1.32)	0.241
Education ($\chi^2=0.61$, $p=0.895$)				
Low	39.1 (267)	Reference		
Moderate	37.9 (1237)	-0.01	0.99 (0.81 - 1.21)	0.914
High	38.4 (301)	0.06	1.07 (0.84 - 1.35)	0.592
Not stated	34.4 (39)	-0.05	0.95 (0.51 - 1.78)	0.882
Income ($\chi^2=5.65$, $p=0.13$)				
Low	36.6 (351)	Reference		
Moderate	38.3 (579)	0.08	1.09 (0.86 - 1.37)	0.498
High	39.9 (804)	0.15	1.17 (0.93 - 1.47)	0.189
Not stated	30.6 (110)	-0.25	0.78 (0.54 - 1.14)	0.197
Perceived addiction to cigarettes ($\chi^2=81.96$, $p<.001$)				
Not at all	20.5 (142)	Reference		
Yes – somewhat addicted	35.7 (773)	0.65	1.91 (1.45 - 2.50)	<.001
Yes – very addicted	47.7 (908)	1.19	3.29 (2.48 - 4.36)	<.001
Not stated	24.3 (21)	0.24	1.27 (0.67 - 2.41)	0.469
Time in Sample ($\chi^2=11.26$, $p=0.004$)				
in 1 wave	39.9 (1536)	Reference		
in 2 waves	30.8 (230)	-0.38	0.69 (0.52 - 0.90)	0.007
in 3 waves	31.3 (78)	-0.54	0.58 (0.39 - 0.88)	0.011

Table A31. GEE results examining any use of effective cessation assistance (excl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=2.54$, $p=0.28$)				
Wave 1 (2016)	51.6 (974)	Reference		
Wave 2 (2018)	48.1 (756)	-0.10	0.91 (0.75 - 1.09)	0.295
Wave 3 (2020)	46.3 (658)	-0.17	0.84 (0.68 - 1.04)	0.113
Wave 3 (2020) vs. Wave 2 (2018)	-	-0.07	0.93 (0.77 - 1.13)	0.464
Age Group ($\chi^2=24.43$, $p<.001$)				
18-24	38.7 (243)	Reference		
25-39	43.7 (677)	0.13	1.14 (0.93 - 1.41)	0.218
40-54	52.0 (751)	0.40	1.49 (1.2 - 1.84)	<.001
55 and up	56.9 (716)	0.52	1.68 (1.34 - 2.1)	<.001
Sex ($\chi^2=0.07$, $p=0.785$)				
Female	49.3 (1026)	Reference		
Male	48.6 (1361)	-0.02	0.98 (0.84 - 1.14)	0.784
Ethnicity ($\chi^2=6.42$, $p=0.04$)				
Non-white (CA, US & EN) or non-English (AU)	49.0 (389)	Reference		
White (CA, US & EN) or English (AU)	48.9 (1957)	-0.27	0.76 (0.61 - 0.94)	0.011
Not stated	49.9 (40)	-0.18	0.83 (0.48 - 1.44)	0.513
Education ($\chi^2=0.45$, $p=0.931$)				
Low	51.2 (658)	Reference		
Moderate	48.9 (1067)	-0.03	0.97 (0.81 - 1.17)	0.767
High	47 (649)	0.04	1.04 (0.83 - 1.30)	0.746
Not stated	44.5 (13)	-0.01	0.99 (0.39 - 2.52)	0.979
Income ($\chi^2=5.23$, $p=0.156$)				
Low	49.7 (517)	Reference		
Moderate	52.6 (720)	0.13	1.13 (0.92 - 1.40)	0.241
High	46.2 (999)	-0.09	0.92 (0.75 - 1.12)	0.403
Not stated	48.7 (150)	-0.04	0.96 (0.70 - 1.33)	0.819
Perceived addiction to cigarettes ($\chi^2=91.02$, $p<.001$)				
Not at all	27.0 (146)	Reference		
Yes – somewhat addicted	42.9 (876)	0.65	1.91 (1.48 - 2.48)	<.001
Yes – very addicted	59.6 (1346)	1.20	3.32 (2.52 - 4.37)	<.001
Not stated	45.7 (19)	0.68	1.97 (0.91 - 4.23)	0.084
Time in Sample ($\chi^2=0.48$, $p=0.786$)				
in 1 wave	49.5 (1646)	Reference		
in 2 waves	48.2 (549)	0.04	1.04 (0.86 - 1.25)	0.706
in 3 waves	46.4 (192)	-0.07	0.93 (0.68 - 1.27)	0.656

Table A32. GEE results examining any use of effective cessation assistance (excl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=1.03$, $p=0.598$)				
Wave 1 (2016)	45.3 (560)	Reference		
Wave 2 (2018)	42.0 (397)	-0.14	0.87 (0.66 - 1.15)	0.326
Wave 3 (2020)	44.3 (323)	-0.05	0.95 (0.67 - 1.33)	0.754
Wave 3 (2020) vs. Wave 2 (2018)	-	0.09	1.09 (0.80 - 1.48)	0.584
Age Group ($\chi^2=19.14$, $p<.001$)				
18-24	34.1 (139)	Reference		
25-39	37.8 (346)	0.03	1.03 (0.74 - 1.45)	0.850
40-54	48.1 (425)	0.42	1.52 (1.10 - 2.09)	0.011
55 and up	52.5 (370)	0.56	1.75 (1.31 - 2.35)	<.001
Sex ($\chi^2=0.11$, $p=0.739$)				
Female	43.6 (619)	Reference		
Male	44.3 (661)	0.04	1.04 (0.82 - 1.32)	0.738
Ethnicity ($\chi^2=2.93$, $p=0.087$)				
Non-white (CA, US & EN) or non-English (AU)	44.7 (353)	Reference		
White (CA, US & EN) or English (AU)	43.7 (928)	-0.24	0.79 (0.60 - 1.03)	0.083
Not stated	-	-	-	-
Education ($\chi^2=4.65$, $p=0.098$)				
Low	43.4 (623)	Reference		
Moderate	43.3 (449)	0.01	1.01 (0.78 - 1.29)	0.966
High	47.5 (209)	0.31	1.37 (0.99 - 1.89)	0.059
Not stated	-	-	-	-
Income ($\chi^2=2.46$, $p=0.482$)				
Low	43.1 (485)	Reference		
Moderate	42.4 (358)	-0.03	0.97 (0.74 - 1.27)	0.824
High	47.5 (209)	0.10	1.11 (0.84 - 1.47)	0.484
Not stated	-	-1	0.37 (0.1 - 1.37)	0.135
Perceived addiction to cigarettes ($\chi^2=69.38$, $p<.001$)				
Not at all	22.3 (99)	Reference		
Yes – somewhat addicted	40.3 (414)	0.84	2.33 (1.67 - 3.24)	<.001
Yes – very addicted	53.9 (744)	1.39	4.01 (2.89 - 5.57)	<.001
Not stated	37.9 (24)	0.92	2.51 (1.11 - 5.66)	0.027
Time in Sample ($\chi^2=1.7$, $p=0.428$)				
in 1 wave	43.5 (882)	Reference		
in 2 waves	45.7 (307)	0.18	1.20 (0.88 - 1.62)	0.246
in 3 waves	42.9 (92)	-0.02	0.98 (0.58 - 1.66)	0.948

Table A33. GEE results examining any use of effective cessation assistance (excl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=0.89$, $p=0.639$)				
Wave 1 (2016)	48.8 (389)	Reference		
Wave 2 (2018)	48.8 (282)	0.13	1.13 (0.78 - 1.64)	0.505
Wave 3 (2020)	45.7 (240)	0.19	1.21 (0.80 - 1.82)	0.361
Wave 3 (2020) vs. Wave 2 (2018)	-	0.07	1.07 (0.72 - 1.58)	0.745
Age Group ($\chi^2=17.8$, $p=0.001$)				
18-24	30.0 (80)	Reference		
25-39	42.6 (319)	0.57	1.77 (0.88 - 3.55)	0.107
40-54	59.6 (284)	1.14	3.13 (1.59 - 6.17)	0.001
55 and up	55.9 (228)	1.03	2.81 (1.41 - 5.60)	0.004
Sex ($\chi^2=1.77$, $p=0.183$)				
Female	45.2 (395)	Reference		
Male	50.3 (516)	0.20	1.23 (0.91 - 1.65)	0.180
Ethnicity ($\chi^2=1.38$, $p=0.24$)				
Non-white (CA, US & EN) or non-English (AU)	38.0 (81)	Reference		
White (CA, US & EN) or English (AU)	49.2 (829)	0.29	1.34 (0.82 - 2.18)	0.243
Not stated	-	-	-	-
Education ($\chi^2=1.57$, $p=0.456$)				
Low	48 (335)	Reference		
Moderate	47.5 (339)	0.05	1.05 (0.74 - 1.49)	0.787
High	48.5 (236)	0.25	1.29 (0.85 - 1.95)	0.231
Not stated	-	-	-	-
Income ($\chi^2=0.4$, $p=0.941$)				
Low	46.0 (171)	Reference		
Moderate	48.6 (227)	0.06	1.06 (0.7 - 1.61)	0.790
High	48.4 (456)	0.12	1.13 (0.76 - 1.68)	0.539
Not stated	47.8 (56)	0.10	1.10 (0.58 - 2.10)	0.773
Perceived addiction to cigarettes ($\chi^2=40.72$, $p<.001$)				
Not at all	19.0 (29)	Reference		
Yes – somewhat addicted	38.2 (266)	1.02	2.77 (1.51 - 5.08)	0.001
Yes – very addicted	59.8 (611)	1.73	5.64 (3.03 - 10.52)	<.001
Not stated	15.8 (4)	-0.27	0.76 (0.22 - 2.64)	0.666
Time in Sample ($\chi^2=12.42$, $p=0.002$)				
in 1 wave	50.7 (668)	Reference		
in 2 waves	44.8 (190)	-0.27	0.77 (0.52 - 1.12)	0.171
in 3 waves	33.6 (53)	-0.89	0.41 (0.26 - 0.66)	<.001

GEE Results – Effective cessation assistance (incl. e-cigarettes)

Table A34. GEE results examining any use of effective cessation assistance (incl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in England (n=4,846)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=0.69$, $p=0.709$)				
Wave 1 (2016)	60.8 (1185)	Reference		
Wave 2 (2018)	62.7 (1031)	0.07	1.08 (0.85 - 1.36)	0.540
Wave 3 (2020)	61.2 (767)	0.10	1.10 (0.86 - 1.42)	0.459
Wave 3 (2020) vs. Wave 2 (2018)	-	0.02	1.02 (0.78 - 1.35)	0.871
Age Group ($\chi^2=13.47$, $p=0.004$)				
18-24	53.1 (543)	Reference		
25-39	60.0 (1099)	0.11	1.11 (0.87 - 1.43)	0.406
40-54	69.2 (759)	0.45	1.57 (1.21 - 2.03)	0.001
55 and up	64.9 (583)	0.24	1.27 (0.97 - 1.66)	0.084
Sex ($\chi^2=1.1$, $p=0.294$)				
Female	60.8 (1434)	Reference		
Male	62.3 (1549)	0.10	1.10 (0.92 - 1.32)	0.29
Ethnicity ($\chi^2=0.7$, $p=0.705$)				
Non-white (CA, US & EN) or non-English (AU)	57.9 (262)	Reference		
White (CA, US & EN) or English (AU)	62.0 (2670)	-0.13	0.88 (0.64 - 1.21)	0.431
Not stated	58.9 (51)	-0.03	0.97 (0.47 - 2.00)	0.936
Education ($\chi^2=14.51$, $p=0.002$)				
Low	68.5 (468)	Reference		
Moderate	61 (1992)	-0.24	0.79 (0.64 - 0.97)	0.027
High	56.9 (445)	-0.43	0.65 (0.51 - 0.84)	0.001
Not stated	68.2 (78)	0.27	1.31 (0.71 - 2.41)	0.393
Income ($\chi^2=12.58$, $p=0.006$)				
Low	61.8 (593)	Reference		
Moderate	63.0 (953)	0.11	1.11 (0.87 - 1.43)	0.404
High	62.7 (1263)	0.16	1.17 (0.92 - 1.49)	0.207
Not stated	48.4 (173)	-0.48	0.62 (0.43 - 0.89)	0.010
Perceived addiction to cigarettes ($\chi^2=116.48$, $p<.001$)				
Not at all	42.0 (290)	Reference		
Yes – somewhat addicted	55.4 (1202)	0.46	1.58 (1.23 - 2.03)	<.001
Yes – very addicted	76.0 (1446)	1.34	3.81 (2.90 - 5.01)	<.001
Not stated	52.9 (45)	0.35	1.41 (0.74 - 2.69)	0.293
Time in Sample ($\chi^2=0.02$, $p=0.988$)				
in 1 wave	61.2 (2358)	Reference		
in 2 waves	62.4 (465)	0.01	1.01 (0.76 - 1.34)	0.957
in 3 waves	63.6 (159)	0.03	1.03 (0.68 - 1.56)	0.878

Table A35. GEE results examining any use of effective cessation assistance (incl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in Canada (n=4,880)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=7.09$, $p=0.029$)				
Wave 1 (2016)	64.0 (1207)	Reference		
Wave 2 (2018)	60.4 (950)	-0.19	0.82 (0.68 - 1.00)	0.050
Wave 3 (2020)	58.9 (837)	-0.29	0.75 (0.61 - 0.93)	0.010
Wave 3 (2020) vs. Wave 2 (2018)	-	-0.09	0.91 (0.75 - 1.12)	0.384
Age Group ($\chi^2=0.73$, $p=0.865$)				
18-24	58.5 (368)	Reference		
25-39	59.0 (916)	-0.05	0.95 (0.77 - 1.18)	0.654
40-54	63.0 (910)	0.04	1.04 (0.83 - 1.29)	0.735
55 and up	63.7 (801)	-0.03	0.97 (0.77 - 1.22)	0.783
Sex ($\chi^2=0.17$, $p=0.677$)				
Female	61.8 (1285)	Reference		
Male	61.0 (1710)	0.03	1.03 (0.88 - 1.21)	0.676
Ethnicity ($\chi^2=3.87$, $p=0.144$)				
Non-white (CA, US & EN) or non-English (AU)	62.3 (494)	Reference		
White (CA, US & EN) or English (AU)	61.3 (2454)	-0.20	0.82 (0.66 - 1.01)	0.066
Not stated	57.2 (46)	-0.35	0.71 (0.4 - 1.25)	0.235
Education ($\chi^2=0.41$, $p=0.939$)				
Low	64.6 (831)	Reference		
Moderate	61.3 (1338)	-0.05	0.95 (0.78 - 1.15)	0.587
High	58.6 (809)	-0.05	0.95 (0.76 - 1.19)	0.633
Not stated	55.3 (16)	-0.16	0.85 (0.34 - 2.14)	0.728
Income ($\chi^2=5.6$, $p=0.133$)				
Low	64.5 (672)	Reference		
Moderate	64.0 (876)	0.02	1.02 (0.82 - 1.28)	0.852
High	58.1 (1256)	-0.19	0.83 (0.68 - 1.02)	0.079
Not stated	61.9 (191)	-0.06	0.94 (0.68 - 1.30)	0.710
Perceived addiction to cigarettes ($\chi^2=87.36$, $p<.001$)				
Not at all	43.0 (232)	Reference		
Yes – somewhat addicted	55.3 (1129)	0.50	1.65 (1.31 - 2.08)	<.001
Yes – very addicted	71.1 (1604)	1.11	3.04 (2.36 - 3.93)	<.001
Not stated	68 (29)	0.95	2.59 (1.26 - 5.34)	0.010
Time in Sample ($\chi^2=4.9$, $p=0.086$)				
in 1 wave	61.2 (2036)	Reference		
in 2 waves	61.7 (703)	0.22	1.25 (1.02 - 1.52)	0.031
in 3 waves	61.8 (255)	0.18	1.2 (0.88 - 1.64)	0.258

Table A36. GEE results examining any use of effective cessation assistance (incl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in the United States (n=2,912)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=0.18$, $p=0.913$)				
Wave 1 (2016)	57.1 (706)	Reference		
Wave 2 (2018)	55.8 (527)	-0.05	0.95 (0.72 - 1.25)	0.713
Wave 3 (2020)	56.8 (415)	0.00	1.00 (0.70 - 1.42)	0.992
Wave 3 (2020) vs. Wave 2 (2018)	-	0.05	1.05 (0.77 - 1.43)	0.752
Age Group ($\chi^2=5.97$, $p=0.113$)				
18-24	53.1 (216)	Reference		
25-39	51.0 (467)	-0.22	0.80 (0.57 - 1.13)	0.211
40-54	59.6 (526)	0.09	1.09 (0.78 - 1.52)	0.607
55 and up	62.2 (439)	0.17	1.19 (0.88 - 1.60)	0.264
Sex ($\chi^2=0.81$, $p=0.369$)				
Female	55.6 (789)	Reference		
Male	57.6 (859)	0.11	1.12 (0.88 - 1.42)	0.368
Ethnicity ($\chi^2=0.1$, $p=0.755$)				
Non-white (CA, US & EN) or non-English (AU)	55.2 (436)	Reference		
White (CA, US & EN) or English (AU)	57.1 (1212)	-0.04	0.96 (0.73 - 1.26)	0.754
Not stated	-	-	-	-
Education ($\chi^2=5.78$, $p=0.056$)				
Low	53.9 (774)	Reference		
Moderate	58.7 (609)	0.22	1.25 (0.97 - 1.60)	0.083
High	60.4 (266)	0.38	1.47 (1.06 - 2.03)	0.021
Not stated	-	-	-	-
Income ($\chi^2=2.29$, $p=0.514$)				
Low	53.9 (607)	Reference		
Moderate	57.9 (489)	0.14	1.15 (0.87 - 1.52)	0.331
High	59.0 (546)	0.12	1.12 (0.85 - 1.49)	0.426
Not stated	37.3 (6)	-0.81	0.44 (0.13 - 1.53)	0.197
Perceived addiction to cigarettes ($\chi^2=39.91$, $p<.001$)				
Not at all	38.6 (171)	Reference		
Yes – somewhat addicted	53.6 (551)	0.54	1.71 (1.22 - 2.39)	0.002
Yes – very addicted	65.0 (897)	1.03	2.79 (2.02 - 3.86)	<.001
Not stated	47.7 (30)	0.54	1.72 (0.77 - 3.87)	0.187
Time in Sample ($\chi^2=2.76$, $p=0.251$)				
in 1 wave	56.2 (1139)	Reference		
in 2 waves	58.4 (393)	0.17	1.19 (0.88 - 1.60)	0.259
in 3 waves	54.8 (117)	-0.19	0.83 (0.49 - 1.41)	0.491

Table A37. GEE results examining any use of effective cessation assistance (incl. e-cig) during an attempt to quit smoking in the past 12-months among respondents in Australia (n=1,898)

	% (n)	Beta (β)	OR (95% CI)	p-level
Wave ($\chi^2=3.67$, $p=0.16$)				
Wave 1 (2016)	54.2 (432)	Reference		
Wave 2 (2018)	59.7 (345)	0.28	1.33 (0.92 - 1.92)	0.132
Wave 3 (2020)	60.0 (314)	0.37	1.45 (0.96 - 2.20)	0.078
Wave 3 (2020) vs. Wave 2 (2018)	-	0.09	1.10 (0.74 - 1.62)	0.649
Age Group ($\chi^2=9.89$, $p=0.02$)				
18-24	44.3 (118)	Reference		
25-39	53.9 (403)	0.36	1.44 (0.75 - 2.77)	0.279
40-54	66.6 (317)	0.82	2.26 (1.19 - 4.29)	0.012
55 and up	62.0 (253)	0.62	1.87 (0.97 - 3.57)	0.061
Sex ($\chi^2=1.73$, $p=0.189$)				
Female	54.5 (476)	Reference		
Male	60.0 (615)	0.20	1.22 (0.91 - 1.65)	0.186
Ethnicity ($\chi^2=1.55$, $p=0.214$)				
Non-white (CA, US & EN) or non-English (AU)	49.7 (106)	Reference		
White (CA, US & EN) or English (AU)	58.5 (985)	0.31	1.37 (0.84 - 2.22)	0.209
Not stated	-	-	-	-
Education ($\chi^2=2.66$, $p=0.265$)				
Low	56.1 (392)	Reference		
Moderate	56.7 (404)	0.08	1.08 (0.76 - 1.54)	0.656
High	60.5 (294)	0.34	1.40 (0.92 - 2.13)	0.116
Not stated	-	-	-	-
Income ($\chi^2=1.1$, $p=0.777$)				
Low	54.4 (203)	Reference		
Moderate	60.4 (282)	0.22	1.25 (0.80 - 1.95)	0.333
High	57.6 (542)	0.07	1.07 (0.71 - 1.62)	0.732
Not stated	55.0 (64)	0.01	1.01 (0.53 - 1.95)	0.972
Perceived addiction to cigarettes ($\chi^2=25.25$, $p<.001$)				
Not at all	42.5 (65)	Reference		
Yes – somewhat addicted	46.9 (326)	0.22	1.24 (0.73 - 2.11)	0.424
Yes – very addicted	67.0 (685)	0.90	2.47 (1.49 - 4.10)	<.001
Not stated	52.7 (15)	0.36	1.44 (0.52 - 4.01)	0.485
Time in Sample ($\chi^2=0.97$, $p=0.617$)				
in 1 wave	57.5 (758)	Reference		
in 2 waves	57.0 (241)	-0.19	0.83 (0.57 - 1.20)	0.328
in 3 waves	58.3 (92)	-0.13	0.88 (0.49 - 1.58)	0.665