

## Title page

### Title

# Predictors and reasons for starting and sustaining quit attempts in a national cohort of Aboriginal and Torres Strait Islander smokers

### Running title

## *Aboriginal and Torres Strait Islander quit attempts*

David P. Thomas<sup>1</sup>, Louise Lyons<sup>2</sup>, Ron Borland<sup>3</sup>

<sup>1</sup>Tobacco Control Research, Menzies School of Health Research, Charles Darwin University, Darwin, Australia

<sup>2</sup>Public Health and Research, Victorian Aboriginal Community Controlled Health Organisation, Melbourne, Australia

<sup>3</sup>Cancer Council Victoria, Melbourne, Australia

David P. Thomas PhD, Head, Louise Lyons MBA, Director, Ron Borland PhD, Nigel Gray Distinguished Fellow in Cancer Prevention.

**Correspondence to** Prof David P. Thomas, Head, Tobacco Control Research, Menzies School of Health Research, Charles Darwin University, PO Box 41096, Casuarina, NT 0811, Australia. E-mail: david.thomas@menzies.edu.au

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as doi: [10.1111/dar.12917](https://doi.org/10.1111/dar.12917)

# Predictors and reasons for starting and sustaining quit attempts in a national cohort of Aboriginal and Torres Strait Islander smokers

## Abstract

**Introduction and Aims.** The national prevalence of daily smoking among the Aboriginal and Torres Strait Islander population is 39% but falling. We explore factors associated with starting and sustaining quit attempts, and reasons given for quitting.

**Design and Methods.** We analysed data from the nationally representative quota sample of 759 Aboriginal and Torres Strait Islander adults who reported smoking at least weekly in the Talking About The Smokes baseline survey (April 2012 – October 2013) who completed a follow-up survey a year later (August 2013 – August 2014).

**Results.** Having made more quit attempts, more recent quit attempts in the past, motivational attitudes, having been encouraged to quit by a health professional and having noticed tobacco advertising were associated with making a quit attempt between surveys. Having made longer quit attempts in the past, non-daily smoking and quit self-efficacy were associated with sustaining abstinence. But neither having made more quit attempts in the past nor dependence was associated with sustaining abstinence. Health concerns, price and setting an example to children were the most common reasons given by smokers and ex-smokers for quitting.

**Discussion and Conclusions.** Different factors predict making and sustaining quit attempts among Aboriginal and Torres Strait Islander smokers. We need to rethink current messages that just encourage Aboriginal and Torres Strait Islander smokers to keep making quit attempts by increasing motivation to quit, as motivation and making more quit attempts does not predict eventual success. We could focus more on increasing smokers' confidence that they can successfully quit.

**Keywords:** Aboriginal, Indigenous, smoking, smoking cessation

## Introduction

The national prevalence of daily smoking among the Aboriginal and Torres Strait Islander population is falling, but at 39% is still 2.8 times that of non-Indigenous Australians and responsible for 23% of the gap in Burden of Disease, measured by disability-adjusted life years [1,2]. There are many possible reasons for this higher smoking prevalence, including socio-economic factors, stress and racism, the normalisation of smoking, limited tobacco control activity in the past, and the entanglement of the histories of smoking and colonisation [3]. The Australian Government recently announced \$184m of funding to continue the Tackling Indigenous Smoking program for another four years [4]. Smoking initiation among adolescents is declining and successful smoking cessation are increasing [5]. However there has been little change in smoking prevalence in remote areas, where successful cessation has not increased but more smokers are reporting having recently made a quit attempt.

Understanding the determinants of both making quit attempts and successfully sustaining abstinence is important to improve Aboriginal and Torres Strait Islander tobacco control activities and policies. The International Tobacco Control Policy Evaluation (ITC) Project has followed national cohorts of smokers in 28 countries. The ITC Four Country study in Australia, Canada, United Kingdom and United States and a recent review of longitudinal studies have found different predictors for starting than for sustaining quit attempts, reflecting the different behavioural processes involved [6-10]. The review found past attempts and motivation to quit were most consistently predictive of making quit attempts, but only measures of dependence were consistently predictive of success [10].

The Talking About The Smokes project is a national cohort of Aboriginal and Torres Strait Islander smokers based on the ITC project. Compared to the Australian ITC sample, a similar percentage of our baseline sample of smokers wanted to quit, had made an attempt in the past year, but fewer daily smokers who had made an attempt in the past five years had ever sustained an attempt for e 1 month [11,12]. In the cross-sectional analyses of our baseline sample, we found that measures of dependence were associated with ever sustaining a quit attempt for e one month, and measures of motivation to quit and social norms were associated with making a recent quit attempt [13-16].

More recently, we investigated which baseline socio-demographic factors predict making quit attempts and sustaining abstinence for e 1 month between baseline and follow-up a year later [17]. Similarly to non-significant and inconsistent findings in the systematic review of longitudinal studies in other populations, almost none of the standard baseline social and economic measures predicted either outcome, only experiencing smoking induced deprivation at baseline predicted both outcomes and more women than men had made an attempt [10,17]. In this paper we extend our recent analysis of socio-demographic factors to investigate any additional contribution of measures of dependence, past quitting experiences and attitudes to smoking and quitting.

## Methods

### Survey design and participants

The Talking About The Smokes Project surveyed 2522 Aboriginal and Torres Strait Islander smokers and non-smokers between April 2012 and October 2013 (baseline survey). This paper concentrates on 759 (48%) of the 1549 participants who smoked at least weekly at the time of the baseline survey who completed a follow up survey approximately one year later (median 12 months, interquartile range 11-15 months), between August 2013 and August 2014.

Aboriginal and Torres Strait Islander people and Aboriginal Community Controlled Health Organisations have been involved in all stages of the project: design, data collection, analysis and research translation. These research methods have been reported in detail elsewhere [18,19]. Briefly, the baseline sample was recruited from communities served by 34 Aboriginal Community Controlled Health Organisations and the Torres Shire Council. The sample used quotas for even recruitment of men and women, and those aged 18-34 and e35 years of age, within the quota established for each site (50 smokers or recent quitters and 25 other non-smokers for 30/35 sites, which was doubled for 4 large urban sites and in the Torres Strait). All survey questions are available on the ITC website [20].

The project was approved by three Aboriginal Human Research Ethics Committees and two Human Research Ethics Committees with Aboriginal subcommittees.

### **Baseline predictor measures**

*Social, economic and demographic factors:* age, gender, remoteness, area-level disadvantage (based on the 2011 Index for of Relative Socio-economic Disadvantage) [21], employment, education, housing tenure, language other than English at home, perceived racism (whether they had been treated unfairly in the past year because they were Indigenous) and smoking-induced deprivation (whether in the past six months, money spent on cigarettes left not enough money for food or other household essentials).

*Quitting history:* ever made a quit attempt, time since last quit attempt, number of quit attempts, duration of longest and last quit attempt. Baseline dependence was measured using the Heaviness of Smoking Index (based on cigarettes per day and time to first cigarette) [22], daily vs non-daily smoking, and ‘how often do you get strong urges to smoke’. Difficulties were assessed by: ‘thinking about things that made your past quit attempt difficult’: ‘did you get strong cravings for smokes’, ‘was it hard to say no when offered a smoke by family and friends’, ‘was it hard to be around people who smoke’, and ‘did you miss the time out you get when having a smoke’.

*Attitudes to smoking and quitting:* ‘do you want to quit smoking’, ‘in the last month have you stubbed out a smoke before you finished it because you thought about the harm of smoking’ (a micro-behavioural indicator of motivation) [23], ‘how easy or hard would it be for you to quit smoking’ (i.e. quit self-efficacy), ‘how worried are you that smoking will damage your health in the future’, ‘how much do you think you would benefit from better health and other things if you were to stop smoking’, do you agree (agree or strongly agree vs disagree or strongly disagree, neither agree or disagree or don’t know) that: ‘you enjoy smoking’, ‘smoking is an important part of your life’, ‘you spend too much money on cigarettes’, ‘smoking calms you down when you are stressed or upset’, ‘if you had to do it over again you would not have started smoking’, ‘Aboriginal and/or Torres Strait Islander community leaders where you live

disapprove of smoking’, ‘there are fewer and fewer places where you feel comfortable smoking’, and ‘being a non-smoker sets a good example to children’.

### **Outcome measures: quit attempts and sustained abstinence for e one month**

We used two outcome measures at follow-up about the period between surveys: (i) made any quit attempt; and (ii) among those who did: sustained abstinence for one month or more. As in recent ITC Project papers, we chose these measures because of growing evidence of different factors predicting starting a quit attempt and preventing relapse (i.e. sustaining abstinence) [24].

### **Time and policy exposure covariates**

We derived a categorical variable to control for variation in the number of months between the baseline and follow up surveys (<11 months, e 11 months & <12 months, e 12 months and <14 months, e 14 months, recoded as three separate indicator variables), to avoid assuming a linear relationship between time and the logit of the probability of making or sustaining a quit attempt between surveys [25]. Other dichotomous covariates measured exposure to tobacco control policies and activities at follow-up: whether: (i) in the last 6 months, noticed advertising and information that talks about the dangers of smoking, or that encourages quitting; (ii) the follow-up survey was after the 12.5% tobacco tax rise on 1 December 2013; (iii) plain packaging was introduced or mandated between surveys; (iv) they reported being encouraged to quit smoking by a health worker, doctor, nurse or other health professional since the baseline survey (only for quit attempts outcome); and (v) they had used any type of nicotine replacement therapy or other stop-smoking medications since the baseline survey (only for sustained abstinence outcome).

### **Reasons given for quitting**

In the follow-up survey we asked whether each of a series of reasons led participants to think about quitting in the past 6 months, were reasons for their quit attempt, or helped them stay off the smokes.

### **Statistical analysis**

All analyses were conducted with Stata 14. The baseline characteristics of our cohort were compared to those lost to follow-up using chi-squared tests for categorical and z tests for dichotomous variables. We do not report the confidence intervals of these or other percentages, as it is not considered statistically appropriate to estimate sampling error in non-probabilistic quota samples [26].

We used logistic regression to assess associations between each predictor measure (just controlling for the time interval between surveys) and the two outcome measures. For each outcome variable, we built a multiple logistic regression model including all the statistically significant predictor measures from the previous step and time interval. Confidence intervals were adjusted for clustering, using Stata’s SVY commands to treat the 35 project sites as sampling units (clusters), and *P* values were based on adjusted Wald tests. We did not use survey weights. The inclusion of variables measuring similar constructs once made the model unstable and the variable with the highest *P* value was dropped. Replacing the retained

with the dropped variable in final model had minimal impact on the magnitude of odds ratios of other variables.

We compared the percentages of smokers and ex-smokers (quit  $\leq 6$  months and  $>6$  months) who reported each of the different factors were reasons for quitting or staying quit at the follow-up survey using chi-squared or Fisher's exact tests.

Analyses excluded refused and don't know responses (except for attitudes measures which included don't know responses with neutral responses in single category). This excluded less than 2.5% of the data for all variables, except 4.0% (30/759) for encouraged to quit by health professional between surveys, 5.0% (38/759) for want to quit, 6.8% (24/352) for sustaining abstinence among those who made a quit attempt and, among reasons for quitting, 3.7% (27/739) for smoking restrictions at work and 4.1% (30/379) for Quitline. The inclusion of many variables (including want to quit and health professional encouragement with larger numbers of missing values) in the multiple logistic regression model for making a quit attempt, meant 104 fewer participants were included in this analysis compared to some of the models just adjusted for time interval in Table 1.

## Results

### Participants

We have previously reported that the baseline results of the recontacted participants who had smoked daily or weekly at baseline were similar to those lost to follow up, except for significant differences in the age distribution and the finding that more of those recontacted were from regional areas and the most disadvantaged areas, and fewer were from major cities [17]. Fewer of those recontacted had reported wanting to quit and having made a quit attempt in the year prior to the baseline survey, but there was no significant difference in nicotine dependence. Almost all (95%) of those recontacted who had reported speaking a language other than English at home reported that this was an Aboriginal or Torres Strait Islander language.

### Predictors of making and sustaining quit attempts

Table 1 shows the association of baseline predictors and making a quit attempt between the baseline and follow-up survey. Table 2 describes the association with sustaining abstinence for a month or more among those who had made a quit attempt. Table 3 lists the variables not included in Tables 1 and 2 because  $P \geq 0.05$  for their association with the outcome after controlling for time interval, with the results for these variables available online in Tables S1 and S2.

#### *Sociodemographic*

Extending our previous results [17], smoking induced deprivation was now no longer associated with making a quit attempt after controlling for past quit attempts and attitude variables, as well as the previously

included encouragement from a health professional. Smoking induced deprivation was again positively associated with at least one month abstinence after controlling for the new set of covariates.

#### *Past quitting and dependence*

Reporting more recent quit attempts at baseline was associated with making a quit attempt between surveys. Having made more quit attempts provided similar results to having made more recent attempts. Neither of these was associated with sustaining abstinence.

More of the non-daily smokers and those who reported ever previously sustaining a quit attempt for a month or more were able to sustain a quit attempt for at least a month between surveys. The duration of the longest ever quit attempt before baseline ( $P=0.004$ ) was more strongly associated with sustaining abstinence between surveys than the duration of the most recent attempt ( $P=0.07$ ). The association of Heaviness of Smoking Index with sustaining abstinence was not significant ( $P=0.9$ ) when just assessed for daily smokers.

#### *Attitudes to smoking and quitting*

Several baseline attitudes to smoking and quitting were associated with making a quit attempt between surveys. More of the smokers made a quit attempt if they reported wanting to quit, stubbing out (the micro-indicator of motivation), health worries about smoking, disagreeing that they enjoy smoking, either disagreeing or agreeing that smoking calms them down (compared to neutral or don't know), and regret about starting smoking. Only higher quit self-efficacy predicted sustaining a quit attempt.

#### *Exposure to tobacco control policies and practices*

More of the smokers who reported noticing tobacco control advertising or information in the six months before follow-up had made a quit attempt between surveys. More of the smokers who had been encouraged to quit by a health professional between surveys had made a quit attempt between surveys.

#### **Reasons given for quitting**

Health concerns, price and setting an example to children were consistently the most common reasons given for thinking about quitting, making and sustaining a quit attempt (Table 4). Not surprisingly, there were significant differences between the four smoking categories for all reasons except the effect on non-smokers, with fewer smokers who had not made a quit attempt in the past six months reporting each reason as contributing to quitting. For all reasons, except health concerns ( $P=0.03$ ), there were only non-significant differences between the results for the other three categories.

## **Discussion**

Different factors predict making and sustaining quit attempts among Aboriginal and Torres Strait Islander smokers. Having made more quit attempts, more recent quit attempts in the past and motivational attitudes

were associated with making a quit attempt between surveys. Having made longer quit attempts in the past, non-daily smoking and quit self-efficacy were associated with sustaining abstinence.

The main strengths of these results are that they are based on longitudinal (rather than cross-sectional) data, and our cohort is broadly similar to the national population of Aboriginal and Torres Strait Islander smokers. There was some differential attrition, and thus some caution may be required in generalising to more advantaged and more motivated Aboriginal and Torres Strait Islander smokers who dropped out at higher rates. More caution is required in the interpretation of our results about sustaining abstinence than about making quit attempts. These results are necessarily based on a smaller sample with less statistical power. Our sample was too small to explore abstinence beyond one month, even though longer abstinence is necessary for health gains and predictors of relapse change over time quit [27]. Different predictors may influence long term success. Our use of self-reported data may have led to less complete recall of shorter and earlier attempts, thus reducing capacity to find associations.

The patterns of the associations with making and sustaining quit attempts are mainly similar to those found in other populations. As elsewhere, we found that Aboriginal and Torres Strait Islander smokers who have more recently made quit attempts are more likely to try again than those who have not recently tried to quit [10,28,29]. Smokers are not giving up trying after these unsuccessful attempts, but remain motivated to try again. Similarly to this previous research, we did not find that having made more quit attempts is associated with making more successful attempts in the future, which belies the notion that smokers learn lessons from earlier unsuccessful attempts and get better until they eventually succeed [28,29]. But we did not find, as others have, that more and more recent unsuccessful attempts are predictive of less success in the future, which has suggested that failed attempts may undermine self-efficacy (or just identifies smokers who find quitting difficult) [29]. As in other populations, we found that duration of previous attempts did predict sustaining future attempts [10]. It is this maintenance and duration of abstinence that needs more focus and encouragement.

More non-daily smokers (who smoked at least weekly) were able to sustain abstinence than daily smokers, as in longitudinal studies in other populations [28,30]. In some longitudinal studies (including an American Indian study), this difference was only apparent between non-daily and heavier daily smokers [31-33]. In contrast, we found no such difference in making quit attempts, even though we found non-daily smokers were more likely to have made a quit attempt in the year before the baseline survey, and non-daily smokers were more likely to make a quit attempt between the first two waves of the ITC Four Country study [12,28]. Further research is warranted to better understand the different issues for light and intermittent smokers in this as in other settings, with the increasing proportion of light smokers in the Aboriginal and Torres Strait Islander population [34]. This likely demonstrates a role for dependence, even though, unlike research in other populations, we found no evidence that less dependent daily smokers were more able to sustain abstinence than those who were more dependent [8,10,28]. In contrast, our cross-sectional analyses of our baseline surveys found associations between most indicators of dependence and having ever previously sustained a quit attempt for a month or more.

We did not detect any association between use of cessation pharmacotherapies between surveys and sustaining abstinence. However, our measure is blunt and not linked to any particular quit attempt, and we



don't know if those who used it, used enough, so caution should be used in interpreting the lack of effect. Our baseline surveys identified that fewer Aboriginal and Torres Strait islander smokers had used these pharmacotherapies, especially among more socio-economically disadvantaged Aboriginal and Torres Strait Islander people [35]. ITC Four Country studies found use of nicotine replacement therapy only predicted abstinence early in quit attempts, in spite of evidence of longer effectiveness from meta-analyses of RCTs [27,36]. In contrast, even after controlling for other variables, we found a strong association between encouragement from a health professional and making a quit attempt between surveys. This confirms a similar cross-sectional association at baseline, supporting ongoing training using guidelines recommending brief interventions by health professionals [37].

In this paper, as in the cross-sectional examination of associations in our baseline data, we found measures of perceived problems caused by smoking (health worry and regret about starting to smoke) were associated with making a quit attempt between surveys, while perceived benefits of smoking (enjoying smoking) were negatively associated [14,15]. These can all be considered indicators of the broad concept of motivation to quit along with more obvious expressions of motivation to quit (wanting to quit and stubbing out cigarettes), which we also found associated with making a quit attempt [38]. Typically, longitudinal research has found that most baseline motivational attitudes were only associated with making quit attempts and not with sustaining abstinence [10,38]. Also consistent with past research, we found quit self-efficacy (how easy it would be to quit) was associated with sustaining abstinence [7,10]. Qualitative research in this setting has 'attributed long term success to an increased sense of self-efficacy not simply regarding smoking cessation but life more broadly', recommending approaches that promote such empowerment rather than just emphasising the risks of smoking [39].

We did not confirm the cross-sectional association we found between local social norms (community leaders disapprove of smoking and there are fewer places you feel comfortable smoking) and making a quit attempt in the past year (and wanting to quit) [16]. Beyond this, we did not find an association with sustaining abstinence 1 month (not tested at baseline). However, our new findings have less statistical power than our baseline analyses. Our finding that recall of tobacco advertising (which addresses social norms and motivation) was associated with more smokers making quit attempts confirms our baseline association with wanting to quit, and supports continued investment in this advertising [11].

As with all Australian smokers and smokers in similar countries, Aboriginal and Torres Strait Islander smokers and ex-smokers most commonly gave health concerns and price as reasons for thinking about quitting, making and sustaining a quit attempt [40]. However, unlike surveys of all Australian smokers, we found concerns about the health of children were similarly commonly given as reasons. This greater perceived motivation to quit by the health of others in this population has been found in previous research, and used in national Indigenous social marketing campaigns, local campaigns and local activity around smoke-free homes [15,16,41-43].

Even though price was named commonly as a reason for quitting, and smoking induced deprivation was associated with making or sustaining a quit attempt, we found no longitudinal association with being exposed to a tax rise between surveys. The impact of tobacco tax rises and price on Aboriginal and Torres Strait Islander smoking and quitting is contested with only limited empirical evidence from this setting, in

spite of consistent evidence of impact in the international literature [44,45]. Similarly, even though we had previously found an association between the introduction of plain packaging between surveys and more smokers reporting forgoing cigarettes because of pack warning labels, we found no association with making or sustaining quit attempts [46]. But as we stated previously, our ability to assess the impact of plain packaging was limited as all smokers were eventually exposed to plain packaging between the surveys.

We need to move beyond increasing motivation and encouraging making more quit attempts as these do not predict eventual quit success. We need more research and focus on preventing relapses, helping people to stay quit. Unfortunately, the most recent Cochrane review of 41 studies found no strong evidence to support any intervention to reduce relapse, recommending more research on extended pharmacotherapy [47]. Our results suggest we could focus more on increasing smokers' confidence and belief that they can successfully quit.

## **Acknowledgements**

We acknowledge and thank the participants, the staff and management of the 34 participating Aboriginal community controlled health services, the Torres Shire Council, the project staff and members of the project leadership group. The project was funded by the Australian Government Department of Health.

## References

1. Australian Bureau of Statistics. National Aboriginal and Torres Strait Islander Social Survey 2014-15. Cat. No. 4714.0. Canberra: ABS; 2016.
2. Australian Institute of Health and Welfare. Australian Burden of Disease Study: Impact and causes of illness and death in Aboriginal and Torres Strait Islander people 2011. Cat. no. BOD 7. Canberra: AIHW; 2016.
3. van der Sterren A, Greenhalgh E, Knoche D, Winstanley M. Tobacco use among Aboriginal peoples and Torres Strait Islanders. In: Scollo MM, Winstanley MH, eds. Tobacco in Australia: Facts and issues. Melbourne: Cancer Council Victoria; 2016. Available at: <http://tobaccoinustralia.org.au/chapter-8-apsi> (accessed October 2018)
4. Minister for Indigenous Health. Four-Year Program to Cut Smoking and Save Lives. (February 2018). Available at: <http://www.health.gov.au/internet/ministers/publishing.nsf/Content/health-mediarel-yr2018-wyatt012.htm?OpenDocument&yr=2018&month=02> (accessed October 2018).
5. Australian Bureau of Statistics. Aboriginal and Torres Strait Islander Peoples: Smoking Trends, Australia, 1994 to 2014-15. Cat. No. 4737.0. Canberra: ABS; 2017.
6. Herd N, Borland R. The natural history of quitting smoking: findings from the International Tobacco Control (ITC) Four Country Survey. *Addiction* 2009;104:2075-87.
7. Herd N, Borland R, Hyland A. Predictors of smoking relapse by duration of abstinence: findings from the International Tobacco Control (ITC) Four Country Survey. *Addiction* 2009;104:2088-99.
8. Yong HH, Borland R, Balmford J, *et al.* Heaviness of smoking predicts smoking relapse only in the first weeks of a quit attempt: findings from the international tobacco control four-country survey. *Nicotine Tob Res* 2014;16:423-9.
9. Borland R. Understanding hard to maintain behaviour change: a dual process approach. Oxford, UK: Wiley Blackwell; 2014.
10. Vangeli E, Stapleton J, Smit ES, Borland R, West R. Predictors of attempts to stop smoking and their success in adult general population samples: a systematic review. *Addiction* 2011;106:2110-21.
11. Nicholson AK, Borland R, Davey ME, Stevens M, Thomas DP. Predictors of wanting to quit in a national sample of Aboriginal and Torres Strait Islander smokers. *Med J Aust* 2015;202:S26-32.
12. Nicholson AK, Borland R, Davey ME, Stevens M, Thomas DP. Past quit attempts in a national sample of Aboriginal and Torres Strait Islander smokers. *Med J Aust* 2015;202:S20-5.
13. Thomas DP, Panaretto KS, Stevens M, Borland R. Dependence in a national sample of Aboriginal and Torres Strait Islander daily smokers. *Med J Aust*. 2015;202:S39-44.
14. Nicholson AK, Borland R, Bennet PT, van der Sterren AE, Stevens M, Thomas DP. Personal attitudes towards smoking in a national sample of Aboriginal and Torres Strait Islander smokers and recent quitters. *Med J Aust* 2015;202:S51-6.
15. Nicholson AK, Borland R, Couzos S, Stevens M, Thomas DP. Smoking-related knowledge and health risk beliefs in a national sample of Aboriginal and Torres Strait Islander people. *Med J Aust* 2015;202:S45-50.
16. Nicholson AK, Borland R, van der Sterren AE, Bennet PT, Stevens M, Thomas DP. Social acceptability and desirability of smoking in a national sample of Aboriginal and Torres Strait Islander people. *Med J Aust* 2015;202:S57-62.
17. Thomas DP, Panaretto KS, Davey M, Briggs V, Borland R. The social determinants and starting and sustaining quit attempts in a national sample of Aboriginal and Torres Strait Islander smokers. *Aust N Z J Public Health* 2017;41:230-6.

18. Thomas DP, Briggs VL, Couzos S, Davey ME, Hunt JM, Panaretto KS, *et al.* Research methods of Talking About The Smokes: an International Tobacco Control Policy Evaluation Project study with Aboriginal and Torres Strait Islander Australians. *Med J Aust* 2015;202:S5-12.
19. Couzos S, Nicholson AK, Hunt JM, Davey ME, May JK, Bennet PT *et al.* Talking About The Smokes: a large-scale, community-based participatory research project. *Med J Aust* 2015;202:S13-19.
20. International Tobacco Control Policy Evaluation Project. Talking About The Smokes. (July 2017). Available at: <http://www.itcproject.org/countries/australia/tats> (accessed October 2018).
21. Australian Bureau of Statistics. Census of Population and Housing: Socio-economic Indexes for Areas (SEIFA), Australia, 2011. Cat. No. 2033.0.55.001. (March 2013). Available at: <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/2033.0.55.001~2011~Main%20Features~Main%20Page~1> (accessed October 2018).
22. Heatherton TF, Kozlowski LT, Frecker RC, Rickert W, Robinson J. Measuring the heaviness of smoking: using self-reported time to the first cigarette of the day and number of cigarettes smoked per day. *Br J Addict* 1989;84:791-9.
23. Partos TR, Borland R, Thrasher JF, Li L, Yong HH, O'Connor RJ *et al.* The predictive utility of micro indicators of concern about smoking: findings from the International Tobacco Control Four Country study. *Addict Behav* 2014;39:1235-42.
24. Cooper J, Borland R, McKee SA, Yong HH, Dugue PA. Depression motivates quit attempts but predicts relapse: differential findings for gender from the International Tobacco Control Study. *Addiction* 2016;111:1438-47.
25. Dupont WD. Statistical modeling for biomedical researchers: A simple introduction to the analysis of complex data. Cambridge, UK: Cambridge University Press; 2002.
26. Dorofeev S, Grant P. Statistics for real-life surveys: Non-simple-random samples and weighted data. Cambridge, UK: Cambridge University Press; 2006.
27. Yong HH, Borland R, Cummings KM, Partos T. Do predictors of smoking relapse change as a function of duration of abstinence? Findings from the United States, Canada, United Kingdom and Australia. *Addiction* 2018;11:1295-304.
28. Hyland A, Borland R, Li Q, Yong HH, McNeill A, Fong GT *et al.* Individual-level predictors of cessation behaviours among participants in the International Tobacco Control (ITC) Four Country Survey. *Tob Control* 2006;15:iii83-94.
29. 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;15:1578-87.
30. Weinberger AH, Pilver CE, Mazure CM, McKee SA. Stability of smoking status in the US population: a longitudinal investigation. *Addiction* 2014;109:1541-53.
31. Henderson PN, Rhoades D, Henderson JA, Welty TK, Buchwald D. Smoking cessation and its determinants among older American Indians: the Strong Heart Study. *Ethn Dis* 2004;14:274-9.
32. Swayampakala K, Thrasher J, Carpenter MJ, Shigematsu LM, Cupertio AP, Berg CJ. Level of cigarette consumption and quit behavior in a population of low-intensity smokers--longitudinal results from the International Tobacco Control (ITC) survey in Mexico. *Addict Behav* 2013;38:1958-65.
33. Yi Z, Mayorga ME, Hassmiller Lich K, Pearson JL. Changes in cigarette smoking initiation, cessation, and relapse among U.S. adults: a comparison of two longitudinal samples. *Tobacco Induc Dis* 2017;15:17.
34. Thomas DP. Changes in smoking intensity among Aboriginal and Torres Strait Islander people, 1994-2008. *Med J Aust* 2012;197:503-6.

35. Thomas DP, Briggs VL, Couzos S, Panaretto KS, van der Sterren AE, Stevens M *et al.* Use of nicotine replacement therapy and stop-smoking medicines in a national sample of Aboriginal and Torres Strait Islander smokers and ex-smokers. *Med J Aust* 2015;202:S78-84.
36. Cahill K, Stevens S, Perera R, Lancaster T. Pharmacological interventions for smoking cessation: an overview and network meta-analysis. *Cochrane Database Syst Rev* 2013;5:CD009329.
37. Thomas DP, Bennet PT, Briggs VL, Couzos S, Hunt JM, Panaretto KS *et al.* Smoking cessation advice and non-pharmacological support in a national sample of Aboriginal and Torres Strait Islander smokers and ex-smokers. *Med J Aust* 2015;202:S73-7.
38. Borland R, Yong HH, Balmford J, Cooper J, Cummings KM, O'Connor RJ, *et al.* Motivational factors predict quit attempts but not maintenance of smoking cessation: findings from the International Tobacco Control Four country project. *Nicotine Tob Res* 2010;12:S4-11.
39. Bond C, Brough M, Spurling G, Hayman N. 'It had to be my choice.' Indigenous smoking cessation and negotiations of risk, resistance and resilience. *Health Risk Soc.* 2012;14:565-581.
40. Kasza KA, Hyland AJ, Borland R, McNeill A, Fong GT, Carpenter MJ *et al.* Cross-country comparison of smokers' reasons for thinking about quitting over time: findings from the International Tobacco Control Four Country Survey (ITC-4C), 2002-2015. *Tob Control* 2017;26:641-8.
41. Johnston V, Thomas DP. Smoking behaviours in a remote Australian Indigenous community: the influence of family and other factors. *Soc Sci Med* 2008;67:1708-16.
42. Gould GS, Munn J, Avuri S, Hoff S, Cadet-James Y, McEwen A *et al.* "Nobody smokes in the house if there's a new baby in it": Aboriginal perspectives on tobacco smoking in pregnancy and in the household in regional NSW Australia. *Women Birth* 2013;26:246-53.
43. Robertson J, Pointing BS, Stevenson L, Clough AR. "We made the rule, we have to stick to it": towards effective management of environmental tobacco smoke in remote Australian Aboriginal communities. *Int J Environ Res Public Health* 2013;10:4944-66.
44. Thomas DP, Ferguson M, Johnston V, Brimblecombe J. Impact and Perceptions of Tobacco Tax Increase in Remote Australian Aboriginal Communities. *Nicotine Tob Res* 2013;15:1099-1106.
45. International Agency for Research on Cancer. IARC Handbooks of Cancer Prevention, Tobacco Control, Vol. 14: Effectiveness of Tax and Price Policies for Tobacco Control. Lyon (France): IARC; 2011.
46. Nicholson A, Borland R, Bennet P, Davey M, Sarin J, Van der Sterren A *et al.* The effect of pack warning labels on quitting and related thoughts and behaviors in a national cohort of Aboriginal and Torres Strait Islander Smokers. *Nicotine Tob Res* 2017;19:1163-71.
47. Hajek P, Stead LF, West R, Jarvis M, Hartmann-Boyce J, Lancaster T. Relapse prevention interventions for smoking cessation. *Cochrane Database Syst Rev* 2013:CD003999.

**Table 1.** Association of baseline factors and policy exposure with making a quit attempt between baseline and follow-up survey in baseline daily/weekly smokers (n=759).

	% (frequency)	Controlling for time only OR (95% CI)	Controlling for all variables OR (95% CI)
<b>Total</b>	n=759 51% (388)		n=655
<b>Socio-demographic factors</b>			
<i>Gender</i>	n=759	<i>P=0.05</i>	<i>P=0.88</i>
Female	55% (224)	1	1
Male	47% (164)	<b>0.73 (0.54, 0.99)</b>	1.02 (0.78, 1.34)
<i>Smoking induced deprivation</i>	n=754	<i>P=0.05</i>	<i>P=0.13</i>
No	49% (285)	1	1
Yes	58% (99)	<b>1.47 (1.00, 2.15)</b>	1.49 (0.88, 2.52)
<b>Past quitting experiences and dependence</b>			
<i>Time since last quit attempt</i>	n=754	<i>P&lt;0.001</i>	<i>P=0.06</i>
Never quit	37% (89)	1	1
>12 months	51% (86)	<b>1.76 (1.04, 2.98)</b>	1.44 (0.78, 2.66)
≤12 months	61% (209)	<b>2.68 (1.77, 4.07)</b>	1.82 (1.12, 2.96)
<i>Number quit attempts ever</i>	n=748	<i>P&lt;0.001</i>	<i>dropped*</i>
0	37% (89)	1	
1-2	52% (126)	<b>1.83 (1.21, 2.77)</b>	
3+	63% (166)	<b>2.97 (1.86, 4.73)</b>	
<b>Attitudes</b>			
<i>Want to quit</i>	n=721	<i>P=0.001</i>	<i>P=0.18</i>
No	39% (96)	1	1
Yes	58% (276)	<b>2.24 (1.43, 3.50)</b>	1.43 (0.84, 2.42)
<i>Stubbed out cigarette in past month because of harm</i>	n=750	<i>P=0.001</i>	<i>P=0.09</i>
No	46% (240)	1	1
Yes	62% (142)	<b>1.99 (1.33, 2.95)</b>	1.44 (0.94, 2.19)
<i>Health worry in future</i>	n=755	<i>P&lt;0.001</i>	<i>P=0.21</i>
Not very worried	46% (228)	1	1
Very worried	60% (156)	<b>1.80 (1.30, 2.49)</b>	1.23 (0.88, 1.72)
<i>Enjoy smoking</i>	n=758	<i>P=0.002</i>	<i>P=0.07</i>
Not agree	69% (77)	1	1
Neutral or don't know	54% (65)	<b>0.55 (0.29, 1.02)</b>	0.67 (0.34, 1.33)
Agree	47% (245)	<b>0.40 (0.24, 0.64)</b>	0.57 (0.34, 0.93)
<i>Smoking calms down when stressed</i>	n=757	<i>P=0.008</i>	<i>P=0.02</i>
Not agree	52% (35)	1	1
Neutral or don't know	29% (15)	<b>0.38 (0.17, 0.87)</b>	<b>0.33 (0.13, 0.82)</b>
Agree	53% (336)	<b>1.02 (0.56, 1.85)</b>	<b>1.03 (0.61, 1.74)</b>
<i>If had to do it again, would not have started smoking</i>	n=758	<i>P=0.01</i>	<i>P=0.02</i>
Not agree	35% (39)	1	1
Neutral or don't know	53% (25)	<b>2.18 (1.20, 3.96)</b>	<b>2.60 (1.33, 5.08)</b>
Agree	54% (323)	<b>2.25 (1.34, 3.79)</b>	<b>1.76 (1.08, 2.85)</b>
<b>Exposure to policy</b>			
<i>Noticed tobacco control advertising in 6 months before follow-up</i>	n=731	<i>P=0.03</i>	<i>P=0.18</i>
No	38% (46)	1	1
Yes	53% (324)	<b>1.80 (1.05, 3.09)</b>	1.48 (0.83, 2.64)
<i>Encouraged to quit by health professional between surveys</i>	n=709	<i>P=0.004</i>	<i>P=0.01</i>
No	42% (168)	1	1
Yes	58% (174)	<b>1.89 (1.25, 2.87)</b>	<b>1.77 (1.14, 2.74)</b>
<b>Time between surveys</b>			
	n=759	<i>P=0.89</i>	<i>P=0.95</i>
<11 months	48% (99)	1	1
11-12 months	48% (61)	0.98 (0.43-2.25)	1.14 (0.47-2.75)
12-14 months	53% (96)	1.21 (0.5-2.93)	1.20 (0.55-2.65)
≥14 months	54% (132)	1.29 (0.52-3.2)	1.28 (0.55-2.97)

*P* value calculated for whole variable using chi-square test. \*Dropped due to collinearity with another variable; variable with lower *P* value kept in model. We repeated final model with all other variables but replacing number of quit attempts variable with quit attempts in the past year (1-2 attempts OR 1.48 [0.88, 2.48], 3+ attempts OR 1.97 [1.19, 3.25], *P*=0.03), and found little change in magnitude of other estimates. CI, confidence interval; OR, odds ratio.



**Table 2.** Association of baseline factors with sustaining a quit attempt between baseline and follow-up survey for one month or more in baseline smokers who had made a quit attempt between surveys (n=352).

	% (frequency)	Controlling for time only OR (95% CI)	Controlling for all variables OR (95% CI)
<b>Total</b>	<i>n</i> =352 34% (121)		<i>n</i> =342
<b>Socio-demographic factors</b>			
<i>Smoking induced deprivation</i>			
No	<i>n</i> =348 31% (80)	<i>P</i> =0.016 1	<i>P</i> =0.002 1
Yes	45% (41)	<b>1.74 (1.12, 2.72)</b>	<b>2.16 (1.34, 3.48)</b>
<b>Past quitting experiences and dependence</b>			
<i>Longest quit attempt</i>			
No attempt in past 5 years	<i>n</i> =347 30% (33)	<i>P</i> =0.004 1	<i>P</i> =0.008 1
<1 month	27% (32)	<b>0.86 (0.42, 1.77)</b>	<b>0.84 (0.40, 1.74)</b>
≥ 1 month	46% (55)	<b>2.07 (1.10, 3.87)</b>	<b>2.18 (1.09, 4.34)</b>
<i>Smoking status</i>			
Non-daily smoker	<i>n</i> =352 65% (20)	<i>P</i> =0.004 1	<i>P</i> =0.014 1
Daily smoker	31% (101)	<b>0.25 (0.10, 0.62)</b>	<b>0.28 (0.11, 0.76)</b>
<b>Attitudes</b>			
<i>Self-efficacy - how easy or hard to quit</i>			
Very hard	<i>n</i> =349 27% (37)	<i>P</i> =0.006 1	<i>P</i> =0.018 1
Not very hard (easy, neither easy nor hard, or a little bit hard)	39% (82)	<b>1.82 (1.20-2.76)</b>	<b>1.75 (1.11-2.75)</b>
<b>Time between surveys</b>			
<11 months	<i>n</i> =352 34% (32)	<i>P</i> =0.04 1	<i>P</i> =0.05 1
11-12 months	50% (29)	<b>1.94 (1.03-3.66)</b>	<b>1.92 (1.07-3.44)</b>
12-14 months	31% (27)	<b>0.89 (0.45-1.75)</b>	<b>0.78 (0.38-1.6)</b>
≥ 14 months	29% (33)	<b>0.79 (0.38-1.64)</b>	<b>0.77 (0.36-1.64)</b>

No policy exposure variables were significantly associated with sustaining a quit attempt. *P* value calculated for whole variable using chi-square test. CI, confidence interval; OR, odds ratio.



**Table 3.** Baseline factors and policy exposures not associated with making or sustaining a quit attempt between baseline and follow-up survey in baseline daily/weekly smokers

Not associated with both quit attempt and sustained abstinence e 1mo	Not associated with making a quit attempt	Not associated with sustained abstinence e 1mo
<b>Socio-demographic factors</b>		
Age		Gender
Remoteness		
Area-level disadvantage		
Education		
Employed		
Purchasing or own home		
Language other than English spoken at home		
Perceived racism		
<b>Past quitting experiences and measures of dependence</b>		
Duration of last quit attempt	Longest quit attempt ever	Time since last attempt
Cravings on last quit attempt	Smoking status (daily/non-daily)	Number of quit attempts ever
Hard to say no on last quit attempt		
Miss time out on last quit attempt		
Hard to be around smokers on last quit attempt		
Heaviness of Smoking Index		
Frequency of urges to smoke		
<b>Attitudes</b>		
How much benefit health and other if quit	Self-efficacy – how easy or hard to quit	Want to quit
Smoking is an important part of life		Stubbed out cigarette in past month because of harm
Spend too much on cigarettes		Health worry in future
Community leaders disapprove of smoking		Smoking calms down when stressed
There are fewer places you feel comfortable smoking		If had to do it again, would not have started
Being a non-smoker is a good example to children		
<b>Exposure to policy</b>		
12.5% tax rise between surveys		Noticed tobacco control advertising in 6 months before follow-up
Plain packaging introduced or mandated between surveys		Used NRT or other stop-smoking medicines since baseline*

Results for the variables in this table are available in online Tables S1 and S2. \* Only assessed for sustained abstinence. NRT, nicotine replacement therapy.

**Table 4.** Percentages of baseline daily or weekly smokers who at follow-up who reported that each factor led them to think about quitting in the past 6 months, was a reason for their quit attempt or helped them to stay off the smokes.

	% (frequency)*				
	Smokers		Ex-smokers		Total (n=739)
	No quit attempt past 6 months (n=397)	Quit attempt past 6 months (n=243)	Quit d 6 months (n=55)	Quit > 6 months (n=27)	
Concern for personal health	81% (318)	93% (224)	100% (55)	88% (22)	87% (635)
Price of cigarettes	78% (306)	90% (216)	85% (47)	80% (20)	83% (602)
Setting an example for children	76% (294)	87% (210)	87% (47)	84% (21)	81% (588)
Concern about the effect of your cigarette smoke on non-smokers	66% (256)	75% (180)	71% (39)	76% (19)	70% (506)
Advice from doctor, dentist or other health professional to quit	60% (232)	77% (187)	78% (43)	72% (18)	68% (495)
Close friends and family disapprove(d) of your smoking	54% (212)	70% (169)	76% (42)	72% (18)	63% (453)
Warning labels on cigarette packs	53% (205)	67% (162)	65% (36)	58% (14)	59% (430)
Advertisements or information about health risks of smoking	49% (190)	63% (151)	60% (33)	76% (19)	56% (405)
Smoking restrictions in public places	49% (189)	63% (150)	67% (36)	52% (13)	56% (401)
Free or lower cost stop smoking medicines	45% (173)	68% (161)	67% (37)	52% (13)	55% (397)
Smoking restrictions at work	36% (137)	46% (109)	55% (30)	44% (11)	42% (297)
Telephone Quitline	25% (97)	34% (78)	43% (23)	36% (9)	30% (216)

\*Percentage who answered yes to each question. 17 smokers did not report when their last quit attempt began, but are included in the total.



Minerva Access is the Institutional Repository of The University of Melbourne

**Author/s:**

Thomas, DP; Lyons, L; Borland, R

**Title:**

Predictors and reasons for starting and sustaining quit attempts in a national cohort of Aboriginal and Torres Strait Islander smokers

**Date:**

2019-03-01

**Citation:**

Thomas, D. P., Lyons, L. & Borland, R. (2019). Predictors and reasons for starting and sustaining quit attempts in a national cohort of Aboriginal and Torres Strait Islander smokers. DRUG AND ALCOHOL REVIEW, 38 (3), pp.244-253. <https://doi.org/10.1111/dar.12917>.

**Persistent Link:**

<http://hdl.handle.net/11343/285542>

**File Description:**

Accepted version