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# The social determinants and starting and sustaining quit attempts in a national sample of Aboriginal and Torres Strait Islander smokers

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Australia's National Tobacco Strategy has a clear focus on addressing the socioeconomic inequalities in smoking and tobacco-related harms.<sup>1</sup> Socioeconomic factors are strongly associated with smoking, with a clear social gradient in smoking prevalence and smoking contributing to the poorer health outcomes of socially disadvantaged people in Australia.<sup>2</sup> In 2013, there was a gradient in age-standardised daily smoking prevalence across the quintiles of area-level disadvantage from the most to least disadvantaged: from 21% to 16%, 13%, 10% and then 7%.<sup>3</sup> More smoking initiation among the most disadvantaged is a greater contributor to these differences in smoking prevalence than less cessation.<sup>2</sup> This paper focuses on increasing successful cessation. It is the fastest practical route to reduce tobacco deaths in the next few decades because the health benefits of reducing initiation are so delayed.<sup>4</sup> To successfully become an ex-smoker, a smoker must first make a quit attempt and then sustain that attempt, with most attempts failing in the first week.<sup>5</sup> Different factors predict starting and sustaining quit attempts, reflecting the different behavioural processes.<sup>6-9</sup> A recent systematic review of longitudinal studies of the general population in several countries found no consistent association between socio-demographic factors and either making or sustaining quit attempts, with mixed results from the included studies.<sup>10</sup>

The National Tobacco Strategy pays particular attention to reducing inequalities in smoking

## Abstract

**Objective:** To assess whether social, economic and demographic measures are associated with initiating and sustaining quit attempts in a national sample of Aboriginal and Torres Strait Islander smokers.

**Methods:** We analysed data from 759 adults who reported smoking at least weekly in the Talking About The Smokes baseline survey (April 2012 - October 2013) and completed a follow up survey a year later (August 2013 - August 2014).

**Results:** Almost none of the standard baseline socioeconomic indicators predicted making or sustaining quit attempts. However, becoming employed was associated with making quit attempts (OR 1.88) and both becoming employed (OR 3.03) and moving to purchase a home (OR 2.34) were both positively associated with sustaining abstinence of one month or more. More smokers who had insufficient money for food or essentials because of money spent on cigarettes had made a quit attempt (OR 1.47) and sustained abstinence of one month or more (OR 1.74).

**Conclusions and implications:** Disadvantage does not seem to have pervasive negative effects on quitting. We should be more optimistic in our tobacco control activities with the most disadvantaged among Aboriginal and Torres Strait Islander smokers. Increasing personal empowerment (e.g. getting a job) may lead to at least short-term improvements in quitting.

**Key words:** Aboriginal, Indigenous, smoking, social determinants

between Aboriginal and Torres Strait Islander and other Australians.<sup>1</sup> Smoking was estimated to cause 12% of the burden of disease and 20% of deaths in the Aboriginal and Torres Strait Islander population, and 17% of the health gap in 2003.<sup>11,12</sup> In response, there has been increased Aboriginal and Torres Strait Islander tobacco control activity and funding.<sup>13</sup> While smoking prevalence has fallen, in 2013 42% of Aboriginal and Torres Strait Islander people aged 15 and over were daily smokers: 2.6 times the age-standardised prevalence in other Australians.<sup>14</sup> All standard national socioeconomic indicators are worse for the Aboriginal and Torres Strait Islander population than for other Australians.<sup>15</sup>

Social inequalities are responsible not only for differences between but within populations.<sup>16</sup> All the assessed indicators of greater socioeconomic disadvantage in three large national household surveys by the Australian Bureau of Statistics of the Aboriginal and Torres Strait Islander population were found to be associated with being a smoker.<sup>17-19</sup> Cross-sectional analyses of the nationally-representative baseline sample from the Talking About The Smokes Project found being employed and having attained Year 12 or higher education were significantly associated with both having ever made a quit attempt and having sustained abstinence for a month or more, but not with having made

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a quit attempt in the past year.<sup>20</sup> There was no significant association between either remoteness or area-level disadvantage and making a quit attempt, although significantly fewer in remote areas than in major cities had sustained abstinence. Fewer people who had been treated unfairly (because they were Indigenous) had made a quit attempt ever or in the past year. More people who reported being unable to buy food or essentials because of money spent on smokes (smoking-induced deprivation) had made a quit attempt in the past year, but fewer had sustained abstinence.

In this paper, we extend those retrospective cross-sectional analyses by testing the hypotheses that baseline social, economic and demographic measures are associated with (a) making a quit attempt and (b) sustaining abstinence for one month or more between the baseline and follow-up survey. We also test whether changes in four of these measures between the surveys are associated with quitting.

## Methods

### Survey design and participants

The Talking About The Smokes Project surveyed 1,721 Aboriginal and/or Torres Strait Islander smokers and recent quitters between April 2012 and October 2013 (baseline surveys). This paper relates to the 1,549 who smoked at least weekly at the time of the baseline survey, of whom 48% (739/1,549) completed a follow-up survey about one year later (median 12 months, IQR 11-15 months), between August 2013 and August 2014. We include an additional 20 participants who chose to complete a short survey asking if they had made a quit attempt since the last survey and if they were now quit, but only for the association between baseline characteristics and these two outcomes at follow-up.

Aboriginal and Torres Strait Islander people and Aboriginal community-controlled 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.<sup>21,22</sup> Briefly, the baseline sample was recruited from 34 Aboriginal Community Controlled Health Services and one community in the Torres Strait. Project sites were selected based on the population distribution of Aboriginal and Torres Strait Islander peoples, by State/Territory and

remoteness. The sample used quotas for even recruitment of men and women, and those aged 18-34 and  $\geq 35$  years of age, within the quota established for each site (50 smokers or recent quitters for 30/35 sites, which was doubled for four large urban sites and in the Torres Strait). Participants were recruited using methods appropriate to the geographic and social context of the project site. People were excluded if they did not identify as Aboriginal or Torres Strait Islander, were less than 18 years of age, were not usual residents of the area, were staff of the health service, or were unable to provide informed consent.

Baseline and recontact surveys were conducted by 101 trained interviewers, almost all of whom were members of the local Aboriginal and Torres Strait Islander community (the seven non-Indigenous interviewers were known locally and employed by the local Aboriginal community-controlled health organisation). All baseline and 83% of follow-up surveys were conducted face-to-face; when a face-to-face survey was not possible, the survey was conducted by phone. The survey was modelled on the International Tobacco Control (ITC) Policy Evaluation Project, particularly the Australian ITC Project surveys. Survey questions are available on the ITC website.<sup>23</sup>

The project was approved by three Aboriginal human research ethics committees (HRECs) and two HRECs with Aboriginal subcommittees.

### Socio-demographic measures

We measured these social, economic and demographic factors at baseline: age (18-24, 25-34, 35-44, 45-54, 55+), gender, remoteness (major city, inner or outer regional, remote or very remote), area-level disadvantage (Socioeconomic Indexes for Areas quintiles 1, quintiles 2-3, quintiles 4-5 based on postcodes and concordance tables for the 2011 SEIFA Index for of Relative Socioeconomic Disadvantage),<sup>24</sup> employed or not, education (less than year 12, finished year 12 or post-school), housing tenure (owns or is purchasing home versus renters and others), Indigenous status (Aboriginal, Torres Strait Islander or both), language other than English at home and perceived racism (whether they had been treated unfairly in the past year because they were Indigenous). We also assessed smoking-induced deprivation: whether in the past six months, money spent on cigarettes left not enough money for food or other household essentials. At follow-up,

we again measured employment, perceived racism, housing tenure and smoking-induced deprivation, and constructed variables describing if these had changed from yes to no or vice versa.

### Outcome measures: quit attempts and sustained abstinence for one month or more

In the follow-up survey, we asked 'Have you tried to quit since we last talked with you on [date of the baseline survey]'. Among those who had made a quit attempt, we asked 'are you still quit or are you back smoking?' and 'Of all the times that you tried to quit smoking since [date of the baseline survey], what is the longest period you stayed completely off the smokes'. Among those who were currently quit, we asked 'How long did your current quit attempt start?' From these four questions we created four outcome measures for the period between the baseline and follow-up surveys: (a) made any quit attempt, (b) sustained abstinence for one month or more, if made a quit attempt, (c) quit at follow-up for greater than a month and (d) quit at follow-up for greater than a month, if made a quit attempt. As in recent ITC Project papers, we concentrated on the first two outcome measures because of growing evidence of different factors predicting starting a quit attempt and preventing relapse (i.e. maintaining abstinence or staying quit).<sup>25</sup> We chose the one-month cut point because different factors predict relapse before and after one month and so predictors of abstinence of one month or more were more likely to also predict prolonged abstinence.<sup>7,8</sup>

### Covariates

We derived a variable to control for variation in the number of months between the baseline and follow-up surveys (<11 months,  $\geq 11$  months & <12 months,  $\geq 12$  months and <14 months,  $\geq 14$  months). Baseline dependence was measured using the Heaviness of Smoking Index, which uses the sum of the scores for responses to questions about cigarettes per day (CPD) and time to first cigarette (TTFC) among daily smokers. These questions were each coded 0 (0-10 CPD, TTFC  $\geq 61$  min), 1 (11-20 CPD, TTFC 31-60 min), 2 (21-30 CPD, TTFC 6-30min) or 3 ( $\geq 31$  CPD, TTFC  $\leq 5$ min). We used four categories in our dependence covariate: non-daily smoker, low (HSI 0-1), moderate (2-3) and high dependence (4-6). Other dichotomous covariates measured exposure to tobacco

control policies and activities at follow-up: whether (a) in the last six months, noticed advertising and information that talks about the dangers of smoking, or that encourages quitting, (b) the follow-up survey was after the 12.5% tobacco tax rise on 1 December 2013, (c) they reported being encouraged to quit smoking by a health worker, doctor, nurse or other health professional since the baseline survey, and (d) they had used any type of nicotine replacement therapy of other stop-smoking medications since the baseline survey. The medicines covariate was only used in models for the second and fourth outcomes, which only included those who had made a quit attempt between the baseline and follow-up.

### Statistical analysis

All analyses were conducted with Stata 14. Our cohort was compared with those lost to follow-up using chi-squared tests for categorical and z tests for dichotomous variables. We used logistic regression to assess the association between each socio-demographic factor (just controlling for the time interval between surveys) and each of the four outcome variables. For each outcome variable, we built a multiple logistic regression model by including all socio-demographic factors with  $p < 0.15$  when just controlling for time interval, time interval, HSI, and all other policy covariates, then removing one at a time variables with the highest  $p$ -value (except time interval which was retained in all models even if non-significant) until all variables in the final model were significant ( $p < 0.05$ ). We tested interactions between socio-demographic variables and dependence and policy co-variables in the final models, but none were significant. Confidence intervals were adjusted for sampling design, using Stata's SVY commands to treat the 35 project sites as clusters, and  $p$ -values were based on adjusted Wald tests. We also used logistic regression to assess the association between the change in four socio-demographic variables and the first two outcome variables (just controlling for time interval).

Analyses excluded refused and don't know responses. This excluded less than 2.5% of the data for all variables, except 5% (38/759) for wanting to quit at baseline.

## Results

### Participants

The baseline results of the 759 recontacted participants who had smoked at least weekly at baseline were similar to those lost to follow-up, except significantly more of those recontacted were from regional areas

( $p < 0.001$ ) and the most disadvantaged areas ( $p = 0.03$ ), and fewer were from major cities ( $p < 0.001$ ) and aged 18-24 years ( $p = 0.02$ ) (Table 1). 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 smoking intensity. Almost all (95%) of those

**Table 1: Characteristics of baseline daily smokers and those who smoked at least weekly at baseline in the cohort compared to those lost to follow-up.**

	Cohort % (frequency)	Lost to follow-up % (frequency)	$p$ -value*
<b>Gender</b>	n=759	n=790	0.05
Female	54% (409)	49% (387)	
Male	46% (350)	51% (403)	
<b>Age</b>	n=759	n=790	<b>0.03</b>
18-24 years	18% (140)	23% (185)	
25-34 years	28% (212)	26% (206)	
35-44 years	23% (176)	26% (202)	
45-54 years	18% (137)	15% (122)	
55+ years	12% (94)	9% (75)	
<b>Indigenous status</b>	n=759	n=790	0.84
Aboriginal	89% (676)	89% (701)	
Torres Strait Islander or both	11% (83)	11% (89)	
<b>Remoteness</b>	n=759	n=790	<b>&lt;0.001</b>
Major cities	18% (138)	34% (272)	
Inner and outer regional	61% (464)	41% (323)	
Remote and very remote	21% (157)	25% (195)	
<b>Area level disadvantage</b>	n=759	n=790	<b>0.006</b>
First quintile (most disadvantaged)	41% (314)	36% (285)	
2nd and 3rd quintiles	43% (323)	42% (330)	
4th and 5th quintiles	16% (122)	22% (175)	
<b>Employed</b>	n=758	n=789	0.62
Yes	34% (260)	35% (280)	
No	66% (498)	65% (509)	
<b>Highest education</b>	n=758	n=776	0.06
<Year 12	50% (376)	54% (422)	
Year 12+	50% (382)	46% (354)	
<b>Purchasing or own home</b>	n=759	n=790	0.57
Yes	14% (104)	15% (114)	
No	86% (653)	85% (659)	
<b>Treated unfairly because Indigenous in past year</b>	n=746	n=760	0.57
Yes	58% (429)	56% (426)	
No	42% (317)	44% (334)	
<b>Language other than English spoken at home</b>	n=754	n=779	0.48
Yes	24% (180)	22% (174)	
No	76% (574)	78% (605)	
<b>Smoking-induced deprivation</b>	n=754	n=779	0.89
Yes	23% (170)	23% (178)	
No	77% (584)	77% (601)	
<b>Wants to quit</b>	n=721	n=747	<b>0.003</b>
Yes	65% (472)	73% (542)	
No	35% (249)	27% (205)	
<b>Quit attempt in the past year</b>	n=754	n=769	<b>0.003</b>
Yes	45% (343)	53% (408)	
No	55% (411)	47% (361)	
<b>Smoking intensity (cigarettes per day)</b>	n=752	n=776	0.68
1-10	37% (279)	35% (268)	
11-20	35% (261)	34% (267)	
21-30	16% (117)	16% (125)	
31+	3% (25)	4% (29)	
Non-daily smoker	9% (70)	11% (87)	

\*  $p$ -values calculated using chi-squared tests for categorical and z tests for dichotomous variables; Bold font indicates significant values ( $p < 0.05$ )

recontacted who had reported speaking a language other than English at home reported that this was an Aboriginal or Torres Strait Islander language.

### Quit attempts and sustained abstinence for one month or more

Half (51%) of the baseline smokers who had smoked at least weekly at baseline had made a quit attempt between surveys, and of these 34% had sustained abstinence for a month or more (Table 2). More smokers whose spending on smokes had meant insufficient money for food or essentials (smoking-induced deprivation) had made (OR 1.47) and sustained (OR 1.74) a quit attempt. Fewer men than women had made

a quit attempt (OR 0.73). All other differences were non-significant, with different patterns for making and sustaining attempts. Only smoking-induced deprivation (OR 1.58, CI 1.05-2.37) remained in the final multiple logistic regression model for making a quit attempt (with covariates time and being encouraged to quit by a health professional between surveys). In the model for sustaining abstinence for a month or more, smoking-induced deprivation (OR 2.03, CI 1.27-3.23) and language other than English (OR 0.48, CI 0.27-0.86) remained (with covariates time, dependence and noticing ads).

Statistically, significantly more smokers had been able to sustain abstinence (for a month or more) if they had become less

disadvantaged between surveys than if they did not change, for measures of employment (OR 3.03) and home ownership (OR 2.34) (Table 3). In the reverse direction, only those who changed so they were no longer purchasing or owning their homes were significantly less likely to have sustained abstinence (OR 0.14). Becoming employed between surveys was associated with making a quit attempt (OR 1.88); other changes were not.

We found that our results were similar if we used being quit for more than one month at follow-up as the outcome, which resulted in 59 respondents who relapsed after one month no longer being considered successful (see the Supplementary Table, available with the online version of this article). Both the association of smoking-induced deprivation and of language other than English with sustained abstinence was replicated.

## Discussion

Almost none of the standard baseline social and economic indicators predicted making quit attempts or sustaining abstinence ( $\geq$  one month). The two exceptions were the associations between gender and making a quit attempt and language other than English and sustaining abstinence (and smoking-specific measure smoking-induced deprivation, which is discussed below).

This mirrors the non-significant and inconsistent findings in the recent systematic review of longitudinal studies in other populations.<sup>10</sup> In contrast, at baseline we found employment, education and living in cities compared with in remote areas (but not area-level disadvantage) were all associated with sustaining abstinence, but that none of these variables were associated with making a quit attempt.<sup>20</sup> We do not believe these new non-significant longitudinal results should be dismissed because of their smaller sample size and so smaller power to detect a real association between baseline socioeconomic differences and future smoking cessation. These limited socioeconomic differences can encourage us to be more optimistic about the relative chances of future successful quitting among the most disadvantaged among Aboriginal and Torres Strait Islander smokers. If these findings reflect longer term abstinence, they suggest that almost all the socioeconomic differences in smoking prevalence within this population are due to differences in initiation.

**Table 2: Quit attempts and sustained one month abstinence between baseline and follow-up surveys of baseline daily smokers and those who smoked at least weekly at baseline.**

	Made a quit attempt		Sustained abstinence for $\geq 1$ month, of those who had made a quit attempt	
	% (frequency)	OR (95% CI)	% (frequency)	OR (95% CI)
Total	51% (388)		34% (121)	
<b>Gender</b>	n=759	<b>p=0.04</b>	n=352	<b>p=0.32</b>
Female	55% (224)	<b>1</b>	33% (66)	<b>1</b>
Male	47% (164)	<b>0.73 (0.54-0.99)</b>	37% (55)	<b>1.23 (0.81-1.87)</b>
<b>Age</b>	n=759	<b>p=0.41</b>	n=352	<b>p=0.40</b>
18-24 years	48% (67)	<b>1</b>	38% (23)	<b>1</b>
35-34 years	50% (106)	1.09 (0.69-1.73)	34% (32)	0.86 (0.44-1.68)
35-44 years	56% (98)	1.36 (0.91-2.05)	33% (30)	0.90 (0.43-1.88)
45-54 years	53% (72)	1.20 (0.81-1.77)	27% (18)	0.63 (0.26-1.48)
55+ years	48% (45)	1.00 (0.58-1.73)	46% (18)	1.39 (0.53-3.65)
<b>Remoteness</b>	n=759	<b>p=0.29</b>	n=352	<b>p=0.20</b>
Major cities	61% (84)	<b>1</b>	35% (28)	<b>1</b>
Inner & outer regional	52% (240)	0.55 (0.24-1.25)	37% (79)	1.49 (0.88-2.52)
Remote & very remote	41% (64)	0.37 (0.10-1.40)	25% (14)	0.77 (0.35-1.71)
<b>Area level disadvantage</b>	n=759	<b>p=0.99</b>	n=352	<b>p=0.16</b>
1st quintile (most disadvantaged)	50% (158)	<b>1</b>	37% (54)	<b>1</b>
2nd & 3rd quintile	52% (167)	1.01 (0.48-2.11)	35% (52)	1.02 (0.46-2.27)
4th & 5th quintile	52% (63)	1.05 (0.44-2.50)	26% (15)	0.55 (0.22-1.39)
<b>Employed</b>	n=758	<b>p=0.75</b>	n=352	<b>p=0.06</b>
No	51% (253)	<b>1</b>	38% (87)	<b>1</b>
Yes	52% (135)	1.06 (0.74-1.52)	27% (34)	0.62 (0.38-1.02)
<b>Highest education attained</b>	n=758	<b>p=0.34</b>	n=351	<b>p=0.60</b>
<Year 12	48% (182)	<b>1</b>	32% (50)	<b>1</b>
Year 12+	54% (205)	1.25 (0.78-2.01)	36% (71)	1.16 (0.65-2.05)
<b>Purchasing or own home</b>	n=757	<b>p=0.53</b>	n=350	<b>p=0.079</b>
No	52% (337)	<b>1</b>	33% (101)	<b>1</b>
Yes	47% (49)	0.85 (0.50-1.44)	49% (20)	1.79 (0.93-3.46)
<b>Treated unfairly because Indigenous</b>	n=746	<b>p=0.59</b>	n=343	<b>p=0.45</b>
No	52% (166)	<b>1</b>	32% (47)	<b>1</b>
Yes	50% (213)	0.90 (0.60-1.34)	36% (70)	1.19 (0.75-1.87)
<b>Language other than English spoken at home</b>	n=754	<b>p=0.78</b>	n=349	<b>p=0.07</b>
No	52% (297)	<b>1</b>	36% (97)	<b>1</b>
Yes	48% (87)	0.90 (0.42-1.93)	28% (22)	0.59 (0.33-1.05)
<b>Smoking-induced deprivation</b>	n=754	<b>p=0.05</b>	n=348	<b>p=0.016</b>
No	49% (285)	<b>1</b>	31% (80)	<b>1</b>
Yes	58% (99)	<b>1.47 (1.00-2.15)</b>	45% (41)	<b>1.74 (1.12-2.72)</b>

Odds ratios were calculated using logistic regression adjusted for the time interval between surveys and the survey design, with p-values for the overall variable based on the adjusted Wald test; Bold font indicates significant values ( $p < 0.05$ )

Quite different explanations are required for the association between becoming employed between surveys and making a quit attempt, the even larger magnitude of this association with sustaining abstinence, and the associations between changes in housing tenure and sustaining abstinence. As these are, in a sense, cross-sectional associations, caution is needed in inferring direct causation. It is likely that there is causation in both directions and a common underlying cause. Previous qualitative research in this setting has emphasised that stopping smoking can either lead to or follow broader personal empowerment and acquiring new skills and social networks.<sup>26</sup> Getting a job, taking out a mortgage and successfully giving up smoking are all significant life achievements reflecting increased control over one's life. Increased control is one of the key mechanisms by which the social determinants influence health outcomes.<sup>16</sup> Much greater differences in control between those making these changes and those not making changes compared with the differences in control between baseline categories may explain why we only detected significant associations in the former but not the latter. Alternatively, these changes may only have a short impact. However, even if successful broader public policies that reduce Indigenous disadvantage only have a small or short impact on smoking cessation and the rapid and sustained health improvements that follow, these add to many other valid social justice and health justifications for these policies.<sup>16</sup>

We also found that more women than men made quit attempts, but there were no differences in sustaining these attempts, the same as at baseline, when we also found that more women wanted to quit.<sup>20,27</sup> While a qualitative study in South Australia found different reasons to quit among Indigenous men and women, a small quantitative study in regional New South Wales found no gender differences in Aboriginal smokers' intention to quit.<sup>28,29</sup> There are also inconsistent results about gender differences in quitting in other settings.<sup>10,30,31</sup> It is not clear if increasing the number of quit attempts by men would lead to more sustained successful attempts.

The other socio-demographic finding of note is that those who speak a language other than English at home were less likely to sustain abstinence. This use of language can represent connections to culture that can be drawn upon to improve health, but

here may indicate less connection to the non-Indigenous community and mainstream resources for quitting. This question about language may more accurately assess this concept than residence in remote areas, which did not predict quitting.

Our significant results about smoking-induced deprivation are different to both our baseline results and the growing literature in this field. Typically, other studies have reported that smoking-induced deprivation and related measures of financial stress are associated with fewer smokers sustaining their quit attempts, but less consistently have reported positive effects on wanting and trying to quit.<sup>32-36</sup> Similar to the published research, at baseline we found this deprivation associated with wanting to quit, making quit attempts, but negatively associated with sustaining attempts.<sup>20,27</sup> Aboriginal and Torres Strait Islander smokers have been reported to be able to continue

to smoke during frequent times of financial stress by increased sharing of cigarettes.<sup>37-40</sup>

The reasons for our unexpected finding of a more prolonged impact of smoking-induced deprivation beyond just starting quit attempts are unclear. Perhaps this deprivation is now more severe or salient (not just more common)<sup>37</sup> in this context. This association may not be enough to sustain abstinence for longer periods, but we found no waning in the association when we looked at our longer abstinence endpoint at follow-up in the Appendix. We recommend further research on this complex interplay between price, financial situation, financial stress and quitting, given the importance of price in tobacco control and the potential negative impacts of price rises on those who are unable to successfully quit.

Increasing taxes to increase cigarette prices has been promoted as one of few

**Table 3: Association of change in social and economic factors with quit attempts and sustained one month abstinence between baseline and follow-up surveys of baseline daily smokers and those who smoked at least weekly at baseline.**

	Made a quit attempt		Sustained abstinence for ≥1 month, of those who had made a quit attempt	
	% (frequency)	OR (95% CI)	% (frequency)	OR (95% CI)
<b>Employment</b>				
<b>Change from not to employed</b>	n=473	<i>p</i> =0.03	n=221	<i>p</i> =0.02
No	48% (201)	1	34% (62)	1
Yes	64% (37)	<b>1.88 (1.05-3.38)</b>	62% (23)	<b>3.03 (1.24-7.41)</b>
<b>Change from employed to not</b>	n=253	<i>p</i> =0.11	n=124	<i>p</i> =0.98
No	54% (101)	1	28% (27)	1
Yes	43% (29)	0.64 (0.36-1.12)	25% (7)	1.01 (0.31-3.29)
<b>Purchasing/own home</b>				
<b>Change from not to purchasing/own home</b>	n=624	<i>p</i> =0.84	n=299	<i>p</i> =0.009
No	51% (295)	1	32% (87)	1
Yes	52% (24)	1.08 (0.51-2.28)	48% (11)	<b>2.34 (1.26-4.33)</b>
<b>Change from purchasing/own home to not</b>	n=96	<i>p</i> =0.29	n=40	<i>p</i> =0.028
No	48% (28)	1	58% (15)	1
Yes	39% (15)	0.62 (0.25-1.53)	29% (4)	<b>0.14 (0.02-0.78)</b>
<b>Treated unfairly because Indigenous</b>				
<b>Change from not to treated unfairly</b>	n=302	<i>p</i> =0.70	n=147	<i>p</i> =0.27
No	50% (100)	1	34% (33)	1
Yes	52% (54)	1.12 (0.62-2.05)	28% (14)	0.66 (0.32-1.40)
<b>Change from treated unfairly to not</b>	n=412	<i>p</i> =0.20	n=193	<i>p</i> =0.05
No	46% (131)	1	31% (38)	1
Yes	58% (75)	1.59 (0.78-3.24)	43% (30)	1.74 (1.00-3.04)
<b>Smoking-induced deprivation</b>				
<b>Change from not to smoking-induced deprivation</b>	n=548	<i>p</i> =0.41	n=239	<i>p</i> =0.61
No	48% (225)	1	27% (57)	1
Yes	42% (32)	0.77 (0.41-1.46)	21% (6)	0.72 (0.19-2.75)
<b>Change from smoking-induced deprivation to not</b>	n=157	<i>p</i> =0.27	n=83	<i>p</i> =0.71
No	62% (41)	1	40% (16)	1
Yes	51% (46)	0.61 (0.24-1.51)	40% (17)	0.84 (0.32-2.21)

Odds ratios were calculated using logistic regression adjusted for the time interval between surveys and the survey design, with *p*-values for the overall variable based on the adjusted Wald test; Bold font indicates significant values (*p*<0.05)

measures that lead to greater falls in smoking prevalence among poorer smokers, but research has verified concerns that higher cigarette prices increase smoking-induced deprivation.<sup>41,42</sup> These concerns are also held by some involved in Aboriginal and Torres Strait Islander tobacco control.<sup>26,38</sup> The only empirical research on the impact of tax rises on Aboriginal communities showed a small non-significant fall in tobacco consumption following a tax rise but community support for tax increases as part of a comprehensive approach to tobacco control.<sup>40</sup> Our findings of more smokers with smoking-induced deprivation both making and sustaining quit attempts may mitigate some of these concerns.

Controlling for confounding by other socio-demographic measures, dependence and exposure to tobacco control activities did not reduce the magnitude of the associations of either smoking-induced deprivation or language other than English and sustained abstinence. These co-variables are unlikely to have been the cause of the associations found.

### Strengths and limitations

The main strengths of this paper are that it is mainly based on longitudinal data and that it examines the different aspects of quitting: making an attempt and sustaining it. However, our measures of sustaining abstinence are limited by the period between surveys and may not equate to long-term abstinence. As with all longitudinal research, attrition was a problem. More of those lost to follow-up were from more disadvantaged areas and more had reported not wanting to quit and not recently making a quit attempt at baseline, so our results are less generalisable to more advantaged Aboriginal and Torres Strait Islander smokers who are more likely to want to quit. We did not measure all social determinants. Income was not asked about as Aboriginal members in our team considered this possibly inappropriate and intrusive in a smoking survey. While we did ask about racism, an important social determinant in this population, we did not ask about cultural determinants except language. Our self-reported data is likely to be limited by incomplete recall of quit attempts biasing results to the null, although this would be expected to be less for more sustained attempts.

### Conclusions

We can be more optimistic in the likely impacts of tobacco control activities among the most disadvantaged Aboriginal and Torres Strait Islander smokers, who do not for the most part appear less able to quit, and who have similar potential to gain not only rapid and sustained health benefits from quitting, but also financial benefits and the increased self-esteem that comes from completing a difficult task.

Tobacco control activities should not only focus on increasing tobacco taxes, which have been shown in other settings to have a greater impact on poorer smokers, but also other proven tobacco-control activities that work similarly well in advantaged and disadvantaged populations.<sup>42,43</sup> We also found some evidence that broader public policies that reduce Indigenous disadvantage (e.g. improving employment) may also have benefits for enhancing smoking cessation, which adds to the benefits of employment for many other social justice and health reasons.

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## Supporting Information

Additional supporting information may be found in the online version of this article:

**Supplementary Appendix 1:** Baseline daily smokers and baseline smokers who smoked at least weekly who had been continuously quit at follow-up for more than a month.