

# BMJ Open Can smoking initiation contexts predict how adult Aboriginal smokers assess their smoking risks? A cross-sectional study using the 'Smoking Risk Assessment Target'

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## ABSTRACT

**Objectives:** Smoking prevalence is slow to reduce among Indigenous Australians of reproductive age. We analysed the relationships between age of smoking initiation, recalled initiation influences and self-assessment of smoking risks in Aboriginal smokers.

**Design, setting and participants:** A community-based cross-sectional survey of Aboriginal smokers aged 18–45 years (N=121; 58 men) was undertaken, using single-item measures. The Smoking Risk Assessment Target (SRAT) as the primary outcome measure enabled self-assessment of smoking risks from 12 options, recategorised into 3 groups. Participants recalled influences on their smoking initiation. Multinomial logistic regression modelling included age, gender, strength of urges to smoke, age at initiation (regular uptake) and statistically significant initiation influences on  $\chi^2$  tests ('to be cool', alcohol and cannabis).

**Results:** Frequent initiation influences included friends (74%; SD 0.44), family (57%; SD 0.5) and alcohol (40%; SD 0.49). 54% (n=65) of smokers had the highest risk perception on the SRAT, selected by those who cared about the smoking risks and intended to quit soon. On multivariate analyses, compared with the highest level of SRAT, male gender, lower age of uptake and strong urges to smoke were significantly associated with the lowest level of SRAT, selected by those who refuted risks or thought they could not quit. Lower age of uptake and alcohol were associated with mid-level of SRAT, selected by those who cared about smoking risks, but did not consider quitting as a priority.

**Conclusions:** Characteristics of smoking initiation in youth may have far-reaching associations with how smoking risks are assessed by adults of reproductive age, and their intentions to quit smoking. Becoming a regular smoker at under the age of 16 years, and influences of alcohol on smoking uptake, were inversely associated with high-level assessment of smoking risks and intention to quit in regional Aboriginal smokers. The SRAT may help tailor approaches to Indigenous smoking cessation.

## Strengths and limitations of this study

- We characterised risk assessment in Aboriginal smokers using a novel single-item Smoking Risk Assessment Target (SRAT).
- This cross-sectional study conducted through face-to-face interviews allowed accommodation for those participants with low literacy.
- The reported influences on smoking initiation relied on recall, and this may be prone to information bias.
- This is the first study of its type in an Indigenous population to assess how smoking initiation contexts can predict how smoking risks are assessed in adulthood.
- The SRAT may be used to tailor approaches to Indigenous cessation.

## INTRODUCTION

Prevalence of smoking is reducing in Indigenous Australians. However, proportions are reducing less reliably for Indigenous smokers of reproductive age. Rates for Indigenous Australian smokers aged 25–34 years (51.5%), and smokers who live in geographically remote areas (50.4%) have not changed significantly in the last 10 years.<sup>1</sup> In these groups, children are more likely to be exposed to environmental tobacco smoke from family and household members. International studies suggest a dose–response relationship in parental smoking and youth initiation (ie, the more parents smoke the earlier their children are likely to take up smoking).<sup>2</sup> Smoking by parents also moderates children's attitudes to smoking,<sup>3</sup> and may have a genetic influence.<sup>4</sup>

## Smoking initiation

Characteristics, in general, that influence smoking uptake include age, alcohol,

parental and peer smoking.<sup>5</sup> In Australia, Indigenous youth may start smoking at a younger age than general population counterparts.<sup>6</sup> Few studies have been published on youth smoking initiation in Indigenous Australians. Normative beliefs impact smoking initiation, with family and peer influences playing key roles in the Northern Territory (NT).<sup>6 7</sup> A study in Western Australia (WA) showed that Indigenous youth were more likely to cite stress, boredom and peer pressure as reasons for smoking than non-Indigenous youth.<sup>8</sup> South Australian (SA) focus groups with young smokers similarly revealed family stressors, social influences and boredom as main initiators.<sup>9</sup> Indigenous parents, while taking measures to limit exposure to passive smoking in the home, find it difficult to deter their children from smoking if they smoke themselves.<sup>10 11–13</sup> High accessibility to tobacco is a risk factor for vulnerable youth.<sup>14 15</sup> Reported reasons for not smoking also include parents and health.<sup>16</sup> Earlier onset of smoking can lead to higher consumption, higher dependence and increased risk of chronic diseases.<sup>17–19</sup>

### Gender

Gender has the potential to impact on predictors, attitudes and experiences of youth smoking. In Australian youth in the general population, smoking initiation in men was more related to risk-taking and a male best friend who smoked, while initiation in women was more related to parental smoking.<sup>20</sup> Only three studies examined gender related to smoking initiation in Indigenous Australians. A New South Wales (NSW) study was limited to women only,<sup>10</sup> and an NT study revealed that adolescent girls were more influenced by peer pressure than boys,<sup>6</sup> and the SA study with single gender focus groups found similar reasons for starting smoking in men and women.<sup>9</sup>

### Perceptions of smoking risks

Risk perceptions for smoking have been assessed through various models, such as the Risk Behaviour Diagnosis Scale,<sup>21</sup> and the Theory of Planned Behaviour.<sup>22</sup> Smokers may downplay the risks of smoking compared to non-smokers.<sup>23</sup> Risk perception may play a stronger role in decisions to stop smoking than in decisions to start.<sup>24</sup> In Indigenous Australians smoking-related knowledge of health risks is generally high.<sup>12 25 26</sup> More than two-thirds of Indigenous Australian smokers (70%) say they want to quit smoking.<sup>27</sup>

### Aims of this study

Despite the research on smoking initiation in the broader population, there is very limited knowledge in Indigenous Australians about how smoking initiation influences are linked with subsequent self-assessments of smoking risks.

The objective of this innovative study was to use a novel smoking risk assessment tool to analyse, in an Aboriginal population, associations between age at

smoking uptake, gender, initiation influences on smoking and perceived smoking risk assessment. This knowledge may inform the development of tobacco prevention and cessation interventions targeted at Indigenous Australians.

We also explored the research question: what are the associations between age of smoking initiation (taking up regular smoking), gender, context of past smoking initiation, and current perceptions of risks from smoking?

### METHODS

A cross-sectional survey was administered in community-based settings at Aboriginal and community events in NSW, based on a published protocol, using a representative quota-based sample based on age and gender-related demographics of smoking in the regional Aboriginal population.<sup>28</sup> The protocol was developed to test two methods to assess the risks of smoking in Aboriginal smokers, the Risk Behaviour Diagnosis Scale,<sup>12</sup> and the Smoking Risk Assessment Target (SRAT):<sup>28</sup> the latter is the subject of this article and is described below. The research question stated above was an extension to those described in the protocol.<sup>28</sup>

The measures in this study are derived from PRIME theory.<sup>29</sup> PRIME proposes five elements in the human motivational structure (P, plans; R, responses; I, impulses and inhibitions; M, motives; E, evaluations), which interact and are influenced by the internal and external environment. A Risk Acceptance Ladder (RAL) was recently designed to assess evaluations relating to smoking risk, and subsequent motives and plans (personal communications Cattaruzza and West, 2012–2014). In theory, a population could simply not know that there was a problem with what they are doing, or they might not believe it, or they might not care, or not feel able to achieve the goal, or might have other priorities, thus no sense of urgency, or they may be keen to quit as soon as possible.<sup>30</sup> Profiling a population in these characteristics can provide a theoretical basis for an intervention strategy. The RAL was adapted for the Indigenous Australian population into a new tool called the SRAT.

The survey instruments were examined for face and content validity by an advisory group of men and women Aboriginal students and staff members at a tertiary institute, who were in the reproductive age range. The group comprised two women students, one male student and two male staff members, with a male Aboriginal elder in attendance. Also, a senior Aboriginal health worker specialising in tobacco management was consulted. According to their feedback, the survey was adapted, as required, for the Indigenous target group.

### Smoking initiation influences

A list of contexts for smoking initiation was developed for this study to assess motives for starting to smoke. A list of 12 potential smoking initiation influences

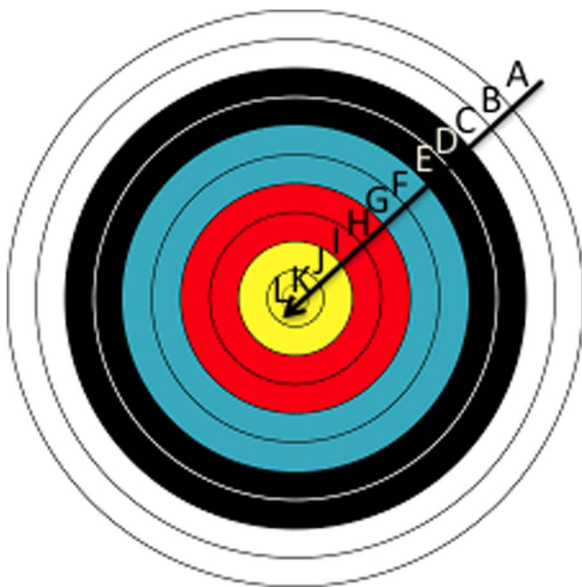
(including a free text option for 'other') was codeveloped with the advisory group and based on the literature. Respondents could choose several responses.

### Smoking risk assessment target

The SRAT was developed from the prototype RAL after discussions with the advisory group. The RAL, based on PRIME theory, was previously used in Europe, to assess the point at which a person's motivation and evaluation of smoking risk is arrested.<sup>30</sup> The RAL enables self-assessment of the participant's perceived acceptance of risk from smoking by selecting 1 out of 10 responses. Two additional responses were added for the SRAT. The RAL is illustrated as a ladder, with higher perceptions of risk being associated with higher rungs of the ladder. The advisory group considered an image of concentric circles to be more culturally acceptable for the Indigenous Australian population, with the centre indicating the highest level of risk perception, thus, a target symbol was used (figure 1). The letters A–L correspond to the choice of specific responses of the SRAT.

The face-to-face interview allowed for a degree of interaction with the participant, with some participants naturally pointing to the responses on the screen of the computer tablet or paper survey. Thus, the SRAT was administered in one of two ways. If the participant was able to read the statements, and wished to self-select one response that best described their current attitude, otherwise the interviewer read out all the options, for one to be verbally selected by the participant.

As a measure of impulses relevant to smoking, we used the Strength of Urges to Smoke (SUTS) from the Mood and Physical Symptoms Scale.<sup>31</sup> This measure is highly correlated with other measures of nicotine dependence, notably the Heaviness of Smoking Index.<sup>32</sup>



**Figure 1** Graphic of target symbol for Smoking Risk Assessment Target.

### Setting and participants

One hundred and twenty-one Aboriginal participants of reproductive age (18–45 years) were recruited by personal intercept at community and Aboriginal events in regional NSW, Australia. Recruitment also included interviewers' networks and street intercepts (table 1). There were 30 separate dates on which participants were recruited from 15 November 2013 to 15 May 2014. Thirty postcodes were represented: all, except two postcodes, from NSW, and most postcodes (88%, N=106) being on the Mid North Coast of NSW.

Participants answered a brief questionnaire during a face-to-face interview from January to May 2014. The interview enabled researchers to assess comprehension, and allow for low literacy as potential sources of information bias. Details of the population, power calculation, recruitment strategy, sampling and the process of Aboriginal cultural consultation are given in the published protocol.<sup>28</sup> The stratified sample by gender and age group was based on population data on smoking prevalence in the local Aboriginal population, and the national census.<sup>12 28</sup>

Approval was obtained from the Aboriginal Health and Medical Research Council of NSW Ethics Committee (approval number 928). Additional institutional ethics committees ratified the primary approval—James Cook University (H4467) and Southern Cross University (ECN-13-242).

### Analysis

Analyses were performed with SPSS V.20. Descriptive analyses were used to assess proportions of participants' responses to demographic questions and the SRAT. Responses were recategorised as follows:

1. The age of initiation (regular uptake of smoking) was split into two categories according to the mean of 16.11 (SD 3.05) that is, below 16 years, and 16 years and above.

**Table 1** Categories of recruitment locations or events of 121 Aboriginal community smokers, in regional NSW in 2014

Type of location or event	N (%)
Cultural	
Aboriginal festival or cultural centre	46 (38)
Health	
Aboriginal health event at ACCHS or youth event	28 (23)
Housing	
Aboriginal housing or residential facility	7 (6)
Sporting	
Aboriginal or mainstream rugby games	19 (16)
Other	
Personal networks or street intercept	21 (17)

ACCHS, Aboriginal community controlled health service; NSW, New South Wales.

- The SUTS (0–5) was recategorised as low to moderate (0–2), and strong (3–5).
- SRAT responses were categorised into three groups for analysis (responses 1–10 indicated a low-risk perception and/or reluctance to quit; response 11 indicated adequate risk perception, a desire to quit, but a low priority for making the change; response 12, indicating a high-risk perception, a desire and strong intention to quit smoking).

$\chi^2$  Tests were performed to examine associations between gender, age of initiation, smoking initiation influences, SUTS and the outcome variable: SRAT (in three categories). Gender was assessed against smoking initiation influences also.

Variables that were significantly associated with the three-category SRAT in descriptive analyses were entered into a multinomial logistic regression model. Ordinal regression was not used, as assumptions for ordinal regression were not met. Variables included age of smoking uptake (two categories), 'to be cool', alcohol and cannabis. Gender, age (nominal scale as only binary categories can be used in the multinomial analysis) and SUTS (two categories) were also entered due to theoretical reasons. Variables that were then found to be non-significant in the model were removed one at a time. If any of the ORs of the remaining variables changed by more than 10%, the variable was retained. A second logistic model which included 'stress' was explored, due to the challenge of stressful life circumstances among Indigenous Australians being reported as important for smoking and quitting.<sup>33 34</sup>

## RESULTS

The response rate for the survey (those who agreed as a proportion of those who were eligible) was 89%.

Summary demographic data are shown in [table 2](#).

Detailed demographic data are reported in another publication.<sup>12</sup> Frequencies of the original 12 categories of SRAT responses, and how they were recategorised, are shown in [table 3](#).

Three options of the SRAT did not attract any responses. The majority of participants (54%, n=65) were in the highest category of concern about smoking risk (SRAT category 3) and intended to try and stop soon, 29% (n=35) also cared about the risks of smoking, but for them quitting was not a priority (SRAT category 2). The remaining 17% (n=21) had a lower level of perceived risk, did not believe they could quit, or were in some form of risk denial (SRAT category 1).

[Table 2](#) also shows the frequencies of responses to influences on smoking initiation, and the univariate associations between these influences for smoking initiation and gender, age of regular smoking uptake and the SRAT in three categories. The most frequent influences on smoking initiation were friends (74%; n=89), followed by family (57%; n=69) and alcohol (40%; n=49). The only significant smoking initiating influence

associated with gender was stress, with women more likely to report stress than men ( $\chi^2$  7.4; df1; p=0.007). 'To be cool', 'with alcohol' and 'with cannabis' were significantly associated with the SRAT. Interestingly, although the influence of family ranks as the second most frequent influence, it was not significantly associated with the SRAT categories.

## Multinomial regression

Seven independent variables were entered into the multinomial logistic regression model. The ratio of valid cases for the multinomial logistic regression was 17, which was more than the minimum (10), and close to the preferred ratio of 20.<sup>35</sup> The overall test of relationship showed the probability of the model  $\chi^2=39.7$  was 0.0003 (<0.05, therefore significant). Therefore, the relationship between the independent variables and dependent variable (SRAT) was supported. The classification accuracy was 62%, which was greater than the proportional by chance accuracy criteria of 50.3%. There was a statistically significant relationship between the SRAT and the smoking initiation influences 'to be cool' (p=0.004) and 'with alcohol' (p=0.017), and also the 'age of uptake of regular smoking' (p=0.009) based on the significance of the  $\chi^2$  statistic in the likelihood ratio tests. Age and cannabis appeared to be confounders, thus left in the model. None of the independent variables had SEs >2, so multicollinearity was unlikely. The multinomial logistic regression analysis with seven variables is detailed in [table 4](#).

The alternative model with the addition of 'stress' as an independent variable did not alter any of the findings (not shown). Those in SRAT category 1 were over three times more likely to be men, have taken up smoking when <16 years (OR=4.64), 84% less likely to report taking up smoking 'to be cool' and 72% less likely to have a moderate compared to high levels of urges to smoke, when compared to those in SRAT category 3. The influence 'with alcohol' approached significance at p=0.051. Participants reporting these characteristics were, therefore, more likely to refute or deny smoking risks, rate the risks of smoking as low, or believe they could not quit.

Those in SRAT category 2 were also more likely to report taking up smoking before age 16 years (OR=2.99), and were almost four times more likely to indicate that they started smoking 'with alcohol', compared with participants in SRAT category 3, when adjusted for other relevant variables.

## DISCUSSION

This was a cross-sectional community-based study of 121 Aboriginal smokers in regional NSW. Single-item measures based on PRIME theory were analysed. Measures included the newly developed SRAT, and influences on smoking initiation, SUTS and age of smoking initiation (uptake of regular smoking).

**Table 2** Sample demographics and smoking initiation influences by SRAT response of 121 Aboriginal community smokers, in regional NSW in 2014

Characteristics	Sample N (%)	SRAT category 1 (R1–10) %	SRAT category 2 (R11) %	SRAT category 3 (R12) %	$\chi^2$ ; df; p value
Gender					3.54; 2; 0.17
Male	58 (48)	20.7	34.5	44.8	
Female	63 (52)	14.3	23.8	61.9	
Age (years)					0.12; 2; 0.1
18–24	36 (30)	16.7	30.6	52.8	
25–34	41 (34)	17.1	29.3	53.7	
35–45	44 (36)	18.2	27.3	54.5	
Age regular smoking uptake					5.7; 2; 0.58
<16 years	53 (44)	22.6	35.8	41.5	
16 years or over	68 (56)	13.2	23.5	63.2	
Strength of urges to smoke					3.42; 2; 0.18
Low–moderate	73 (60)	13.7	26	60.3	
Strong	48 (40)	22.9	33.3	43.8	
Initiation influences					
To be cool**					
Yes	38 (31)	5.3	47.4	47.4	11.6; 2; 0.003
No	83 (69)	22.9	20.5	56.6	
With alcohol*					
Yes	49 (40)	18.4	40.8	40.8	6.63; 2; 0.036
No	72 (60)	16.7	20.8	62.5	
Friends smoking					
Yes	89 (74)	18	33.7	48.3	4.57; 2; 0.10
No	32 (26)	15.6	15.6	68.8	
With cannabis*					
Yes	25 (21)	8	52	40	7.67; 2; 0.02
No	96 (79)	19.8	22.9	57.3	
Peer pressure					
Yes	47 (39)	8.5	27.7	63.8	4.97; 2; 0.08
No	74 (61)	23	29.7	47.3	
Stress					
Yes	35 (29)	20	25.7	54.3	0.38; 2; 0.83
No	86 (71)	16.3	30.2	53.5	
Family smoking					
Yes	69 (57)	18.8	30.4	50.7	0.6; 2; 0.74
No	52 (43)	15.4	26.9	57.7	
For weight control					
Yes	2 (2)	50	50	0	2.65; 2; 0.26
No	119 (98)	16.8	28.6	54.6	
Lighting cigarettes for others					
Yes	11 (9)	27.3	18.2	54.5	1.17; 2; 0.56
No	110 (91)	16.4	30	53.6	
Curiosity					
Yes	19 (16)	21.1	26.3	52.6	0.24; 2; 0.89
No	102 (84)	16.7	29.4	53.9	
Boredom					
Yes	13 (11)	15.4	23.1	61.5	0.37; 2; 0.83
No	108 (89)	17.6	29.6	52.8	

\*p&lt;0.05; \*\*p&lt;0.01; \*\*\*p&lt;0.001.

df, degrees of freedom; R1–10, response 1–10 etc; NSW, New South Wales; SRAT, Smoking Risk Assessment Target.

This study extends the limited evidence from other studies on Indigenous smoking initiation. Friendships and family networks, drinking alcohol and stressful life events were key initiators of smoking in a NSW study on Indigenous Australian women.<sup>10</sup> The role of alcohol in

smoking initiation was also highlighted in a study in NT youth.<sup>6</sup> Indigenous youth reported that family members sometimes had a key role in instructing them about how to smoke.<sup>6</sup> Similar influences are reported by young Indigenous people in SA, with desires ‘to be cool’, and

**Table 3** Specific SRAT responses (and recategorisation) of 121 Aboriginal community smokers, in regional NSW in 2014

Response	Statement	N (%)
1	(A) I have never heard that smoking can be harmful (risk ignorance)	0 (0)
2	(B) I have heard that smoking can be harmful, but it is too scary to think about (risk avoidance)	0 (0)
3	(C) I have heard that smoking can be harmful, but I think the risk is exaggerated (risk denial)	1 (1)
4	(D) I accept that smoking can be harmful, but I do not think it will be so for me (risk denial)	2 (2)
5	(E) I accept that smoking could be harmful for me, but I do not care very much (risk acceptance)	5 (4)
6	(F) I care that I could be harmed by smoking, but I think the risk is worth it (risk acceptance)	2 (2)
7	(G) I do not think the risk of smoking is worth it, but there is no point in trying to stop because the damage has been done (risk fatalism)	2 (2)
8	(H) I do not think the risk of smoking is worth it, but I do not think I can stop (risk fatalism)	7 (6)
9	(I) I accept that smoking can be harmful, and the danger is part of the attraction (risk seeking)	0 (0)
10	(J) I accept that smoking can be harmful, but I would feel shame if I failed at quitting (risk humiliation)	2 (2)
	<b>Category 1 SRAT</b>	<b>21 (17)</b>
11	(K) I care about the risks of smoking and plan to try to stop, but it is not a priority at the moment (risk procrastination)	
	<b>Category 2 SRAT</b>	<b>35 (29)</b>
12	(L) I care about the risks of smoking and definitely intend to try to stop soon (risk engagement)	
	<b>Category 3 SRAT</b>	<b>65 (54)</b>

NSW, New South Wales; SRAT, Smoking Risk Assessment Target.

peer pressure frequently cited, and stress and boredom.<sup>9</sup> Conversely, Indigenous Australians who did not smoke reported a lack of peer pressure as a reason.<sup>36</sup>

### Smoking initiation

Results indicated that the recalled reasons for smoking initiation have a significant association with current smoking risk assessment. Starting smoking at a younger age (before 16 years) predicted being three to four times less likely to appropriately assess the risks of

smoking, and not prioritise quitting. The influence of alcohol at initiation was significantly associated with SRAT category 2 indicating that these smokers care about the risks of smoking, but for them quitting was not a priority. This finding implies a lack of prioritisation for the risks of smoking and an intention to delay quitting for those who had been influenced by alcohol or had started at a younger age.

Whereas for SRAT category 1, the predictors were male gender, a reduced likelihood of starting 'to be

**Table 4** Multinomial logistic regression model of predictors for three-category SRAT in 121 Aboriginal smokers in regional NSW, in 2014

Independent variable	N	Logit 1 adjusted OR (95% CI) category 1 vs category 3 SRAT	Logit 2 adjusted OR (95% CI) category 2 vs category 3 SRAT
Age (nominal)	121	1.04 (0.97 to 1.12)	1.0 (0.94 to 1.07)
Gender			
Male	58	3.51 (1.09 to 11.34)*	1.69 (0.66 to 4.31)
Female	63	–	–
Age of uptake of regular smoking			
<16 years	53	4.64 (1.42 to 15.15)*	2.99 (1.13 to 7.91)*
16 years or over	68	–	–
Influence 'to be cool'			
Yes	38	0.16 (0.3 to 0.91)*	2.17 (0.74 to 6.41)
No	83	–	–
Influence 'with alcohol'			
Yes	49	2.88 (0.82 to 10.18)	3.66 (1.32 to 10.2)*
No	72	–	–
Influence 'with cannabis'			
Yes	25	0.33 (0.05 to 2.11)	1.52 (0.48 to 4.84)
No	96	–	–
SUTS			
Low-moderate	73	0.28 (0.09 to 0.91)*	0.58 (0.22 to 1.53)
Strong	48	–	–

\*p<0.05; \*\*p<0.01; \*\*\*p<0.001.

NSW, New South Wales; SRAT, Smoking Risk Assessment Target; SUTS, Strength of Urges to Smoke.

cool', and lower likelihood of having low-moderate compared to strong urges to smoke (or dependence). These influences of being male, taking up smoking under 16 years of age, alcohol and a higher dependence level, place the respondents on the outer rings, further away from the centre of the SRAT's bulls-eye—thus, theoretically, further from the goal of quitting.

Although the influence of family on smoking initiation was reported in over 50% of our participants, this influence did not appear to be associated with level of risk assessment on the SRAT. The relative differences in peer versus family influences for initiation have been reported internationally,<sup>37–39</sup> but are currently unknown in relation to Indigenous Australians.<sup>6</sup> Our study, however, was able to differentiate, for the first time, some differences in associations between family and peer influences on how Indigenous adults view the risks of smoking, prioritisation and intention to quit. Also, the influence of stress on initiation did not show any significant associations for the way risks were assessed in our study. This contrasts with stress being reported as a major barrier to quitting in Indigenous communities.<sup>26 34</sup> However, stress has also not been associated with quitting outcomes in a large national Indigenous study.<sup>33</sup>

### Age of initiation

Importantly, the age of initiation into regular smoking was significantly different between the higher level of the SRAT and the lower two levels. The SUTS were significantly associated with the lowest level of SRAT, implying that nicotine dependence (cravings, urges and impulses) could be one of the current factors predicting a lower concern about risks, or believing that one is unable to quit. Conversely, independent of nicotine dependence levels, a later age of smoking initiation was associated with increased likelihood of quitting in a large US sample of young adults.<sup>19</sup>

### Gender

Smoking initiation influences have been reported to become increasingly gendered, and this warrants further exploration in the Indigenous context. In Australia, analytical modelling from longitudinal data on year 7–10 students revealed male gender and smoking was associated with risk-taking behaviours, and having a male best friend who smokes.<sup>20</sup> Australian women were more influenced to take up smoking by family (at least one parent smoking).<sup>20</sup> Stronger peer influences on women were supported in a qualitative study on Indigenous smoking initiation.<sup>6</sup> Our findings that male gender predicted membership in the SRAT group least likely to realistically assess the risks of smoking or intent to quit, may indicate a different attitude to risks in general. This finding agrees with our assessment with the risk behaviour diagnosis scale, which indicated Aboriginal men with low-risk perception and low efficacy were more likely to hold defensive motivations about quitting, such as denial or avoidance.<sup>40</sup>

### Strengths and limitations

The study uniquely characterised smoking risk assessment and associated intention to stop smoking, and in a population that might be less engaged with quitting as a goal.<sup>27 41</sup> Using measures that had undergone a process of face and content validity with Aboriginal advisors of reproductive age strengthened this novel study. The high response rate was a strength of the study, and face-to-face interviews allowed accommodation for those participants with low literacy. There were some variations in how participants completed the survey during the face-to-face interview, where some chose to be interactive with the computer tablet or paper survey, and this may have biased the results. Data was not collected on which participants had engaged in which way. This is the first study of its type in an Indigenous population to assess how smoking initiation contexts can predict how risks are assessed in adulthood. The reported influences on smoking initiation relied on recall, and this may be prone to information bias. Social desirability bias may affect the reporting of smoking attitudes and behaviours. The study based in one region of NSW may have limited generalisability: to confirm the suitability of the SRAT, the research should be repeated with a larger sample of the Indigenous population. The small sample size limited the number of independent variables modelled in the regression analysis. This cross-sectional study does not permit any causal interpretations of the associations between reported influences of smoking initiation and the other study variables.

### Implications for practice and policy

Our results may have important implications for tobacco control strategies for smoking initiation prevention and smoking cessation. Encouragingly, Indigenous smoking rates are decreasing among youth.<sup>42</sup> Overall influences in Australia are likely to be tobacco control policies, media campaigns and price increases.<sup>43 44</sup> However, there is still an urgent need for targeted programmes in Indigenous youth for substance use in general.<sup>45</sup> If those who start smoking later assess their smoking risks more realistically, delaying smoking initiation in Indigenous smokers may be a worthy aim for tobacco control measures. However, specific interventions for tobacco use prevention in Indigenous youth have not yet been shown to be effective.<sup>46</sup>

In the case of the Aboriginal smokers in the study, 30% wanted to quit, but for them it was not a priority. One difference for these smokers was the influence of alcohol, which putatively could represent current use (not assessed here, but it is acknowledged that assessment of current alcohol use may have strengthened the study). Alcohol exposure in children, and its concomitant influence on smoking initiation, may have far-reaching untoward influences on later prioritisation for quitting, and the way smoking risks are assessed in smokers of reproductive age. Clustering of risks has been noted between tobacco, alcohol and cannabis in high-risk Indigenous

pregnant women,<sup>10</sup> and in Indigenous youth in the NT.<sup>6</sup> These clusters could become the focus of further interventions, as could gender-specific interventions.

## CONCLUSIONS

In conclusion, in this regional sample of 121 Aboriginal smokers of reproductive age in NSW, taking up smoking when younger than 16 years of age, male gender, influences of alcohol and strong urges to smoke had significant associations with how smoking risks were assessed, after controlling for other variables. Conversely, influences of family and stress on smoking initiation did not appear to be significant for current smoking risk assessment.

The SRAT, developed for this study, is a new culturally appropriate tool that characterises the content of risk assessment along with associated motivation to stop smoking. Profiling the target population in these characteristics provides a theoretical basis and creates new hypotheses for potential tobacco control and cessation strategies. The SRAT could aid researchers and practitioners to personalise approaches to the point at which a person's evaluation of smoking risk and related motivation is arrested. Reasons for quitting not being a priority, however, need further exploration. A further study using the SRAT over two time points would be useful to determine if the measures have any predictive relationship with quitting behaviours.

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**Collaborators** Dr Andy McEwen.

**Contributors** GSG conceived and designed the project, adapted the survey instruments and their digital online format, tested suitability of the survey for Aboriginal participants, conducted surveys, trained and supervised research assistants, collated, analysed and interpreted results, wrote all drafts of the manuscript. KW contributed to the research design and statistical analysis, checked all statistical findings/interpretations. RW advised on tobacco smoking risk behaviours, the adaptation of the survey instruments, and interpretation of findings. YC-J, as Aboriginal academic advisor, advised on the Aboriginal community consultation processes, recruitment, and the cultural interpretation of results. ARC oversaw the study and advised on all

aspects, including the analysis, interpretation and presentation of results. All authors critically reviewed the manuscripts.

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**Data sharing statement** Information regarding unpublished data is available by emailing the first author. The unpublished data comprise the results of the Motivation to Stop Smoking Scale in the sample, referred to in our published protocol.<sup>28</sup>

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