


# The social determinants of Aboriginal and Torres Strait Islander adults who do not smoke in regional Australia

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## Abstract

**Introduction:** Commercial tobacco use was systematically embedded as a valuable commodity through colonisation that continues to be exploited for profit by the Tobacco Industry. There have been significant declines in current smoking prevalence among Aboriginal and Torres Strait Islander peoples 18 years and over, from 55% in 1994 to 43% in 2018–2019. This paper seeks to better understand smoke-free behaviours, and to systematically quantify associations between a range of SDOH and non-smoking/never-smoking among Aboriginal and Torres Strait Islander adults ( $\geq 18$ ) living in regional Australia.

**Objective:** To explore the social determinants of health (SDOH) related to non- and never-smoking among Aboriginal and Torres Strait Islander peoples in regional Australia.

**Design:** Cross-sectional analysis of the NATSIHS, weighted to the Aboriginal and Torres Strait Islander adult population living in regional Australia, was conducted. Participants were characterised as people who were current smokers, never-smokers and non-smokers (ex- and never-smokers). The social determinants of health exposures related to socioeconomic position, well-being and access to healthcare.

**Setting:** Regional Australia is distinct from urban and remote areas, based on the ASGS Remoteness Structure (ABS) 2018–2019.

**Participants:** Aboriginal and Torres Strait Islander adults ( $\geq 18$  years) who were selected, consented and asked questions about smoking in the National Aboriginal and Torres Strait Islander Health Survey (NATSIHS 2018/19).

**Results:** High income was associated with non-smoking (Prevalence Ratio [PR] = 2.07; 95% CI: 1.66–2.57) and never-smoking (PR = 2.02; 1.46–2.79), as was completing year 10 (non-smoking PR = 1.34; 1.12–1.61 and never-smoking PR = 1.56; 1.20–2.03). Better food security was associated with a higher prevalence of never-smoking (PR = 2.42; 1.48–3.98). Lower psychological distress scores were

associated with non-smoking (PR = 1.30; 1.10–1.53) and never-smoking (PR = 1.56; 1.21–2.01). Never-smoking was more frequent in participants reporting no experiences of unfair treatment (PR = 1.59; 1.22–2.06). Having a usual healthcare provider was associated with non-smoking (PR = 1.38; 1.02–1.86). Positive exposure to the SDOH were associated with non- and never-smoking among Aboriginal and Torres Strait Islander adults in regional Australia. Structural and systemic changes to address the SDOH, including discrimination and racism, are expected to accelerate non-smoking behaviours and improve health outcomes for Aboriginal and Torres Strait Islander peoples.

#### KEYWORDS

Aboriginal and Torres Strait Islander, regional Australia, smoking, social determinants, tobacco use

## 1 | INTRODUCTION

There is vast diversity among Aboriginal and Torres Strait Islander peoples, including across languages, cultures, practices, and relationship to land and Country within and between communities.<sup>1</sup> There are also very different first contact experiences with settler-colonists across the different communities and of ongoing colonial experiences and associated impacts on health and wellbeing.<sup>2</sup> While many studies aggregate Aboriginal and Torres Strait Islander peoples as a single population group, some focus on Aboriginal and Torres Strait Islander peoples in specific areas, mainly 'urban' or 'remote' settings. However, there is a lack of research into regional areas of Australia. Prioritising regional Australia is particularly important given there are over 389 000 Aboriginal and Torres Strait Islander peoples living in regional areas (approximately 44% of the Aboriginal and Torres Strait Islander population),<sup>3</sup> who have separate and distinct experiences from Aboriginal and Torres Strait Islander peoples living in urban or remote Australia.

Commercial tobacco use was systematically embedded as a valuable commodity that continues to be exploited for profit by the Tobacco Industry. This included settler-colonists offering tobacco to Aboriginal and Torres Strait Islander peoples in lieu of wages, and using tobacco to exploit communities for goods and services.<sup>1</sup> Despite ongoing settler-colonisation contributing to conditions that promote tobacco use, current smoking prevalence among Aboriginal and Torres Strait Islander peoples 18 years and over has significantly decreased from 55% in 1994 to 43% in 2018–2019.<sup>4,5</sup> However, the Tobacco Industry continues to actively market and sell tobacco products, with 37% of all Aboriginal and Torres Strait Islander adult deaths attributed to smoking.<sup>6</sup>

Smoking is a leading contributor to the burden of disease, including but not limited to causal associations to respiratory conditions (46.9% of the Aboriginal and Torres Strait Islander disease burden), cancer (37.2%) and cardiovascular disease (CVD) (34.2%).<sup>7</sup> The Tobacco Industry continues to fuel the use of commercial tobacco and associated harms, a trend that was entrenched through colonisation.<sup>1</sup>

Smoking prevalence in regional Australia varies significantly from remote and urban areas. Current smoking prevalence decreased by 8.3 percentage points in regional areas from 1994 to 2018/19, and 23% in urban areas and 5% in remote areas over the same period,<sup>5</sup> reflecting the diversity in smoking behaviours. Overall, the majority (57%) of Aboriginal and Torres Strait Islander adults aged 18 years and above do not smoke,<sup>5</sup> and smoke-free behaviours are becoming increasingly common in regional communities.<sup>8</sup>

Understanding the factors influencing smoke-free behaviours can assist with developing policies and programs to accelerate smoke-free trends, and provide better protection from the Tobacco Industry and affiliates.<sup>9,10</sup> Despite the active role of the Tobacco Industry,<sup>9,10</sup> many relevant factors for being smoke-free include the Social Determinants of Health (SDOH). The SDOH cover the circumstances in which people grow, live, work and play that enables them to achieve full health.<sup>11</sup> A range of determinants facilitate smoke-free behaviours among Aboriginal and Torres Strait Islander peoples, including greater socio-economic status (SES), higher educational attainment, good social and emotional wellbeing, participation in sport, and cultural identification.<sup>12,13</sup> Conversely, discrimination and racism contribute to poor health, including tobacco-related harms.<sup>1,14</sup> Similarly, emotional, social, and physical wellbeing,

healthy diet, social supports, and positive role models have also been explored as protective factors that influence health outcomes.<sup>14–17</sup>

There is increasing evidence of the contribution of the SDOH to smoking, particularly SES.<sup>11</sup> Some research conducted in regional Australia has identified common predictors of smoking, including life stressors and social factors, such as regular use of healthcare and family conditions.<sup>18,19</sup> This paper seeks to better understand smoke-free behaviours, and to systematically quantify associations between a range of SDOH and non-smoking/never-smoking among Aboriginal and Torres Strait Islander adults ( $\geq 18$ ) living in regional Australia. Building on previous work, this will develop a more comprehensive picture of the drivers of non-smoking behaviours in regional Australia, informing tobacco control programs and policies, and in turn accelerating smoke-free behaviours and improving health outcomes.

## 2 | METHODS

### 2.1 | Relationality

We recognise that Relationality is a central concept within Indigenous worldviews, and the holistic conception of the interconnectedness and inter-substantiation between and among all living things.<sup>17</sup> Further, the research team members' worldviews influence our perspectives, values and relationships; informing this research and how the study and analysis was conducted.<sup>20,21</sup> The research team brings Aboriginal and Torres Strait Islander lived experience (RC, MK, MMB, TC, LJW), Indigenous lived experiences (RM), experience in Indigenous tobacco research (CH, EMB, MK, RM and RC), public health (all authors) and experiences living in regional Australia (all authors). An ongoing integrated knowledge translation approach which privileged Aboriginal and Torres Strait Islander peoples lived experiences and worldviews was undertaken. This included quarterly reporting, input, and feedback from Thiitu Tharmmay, a national Aboriginal and Torres Strait Islander Advisory Group that provides valuable insight and guidance to the Tobacco Free Program. Suggestions and feedback were integrated throughout this research process, including in the development of this manuscript.

### 2.2 | Strengths-based approach

This paper takes a strengths-based approach, reporting positive behavioural outcomes (being smoke-free) and a positive framing of exposures, within the limits of the

### What is already known on this subject

- Colonisation entrenched tobacco use for Aboriginal and Torres Strait Islander peoples living in regional Australia. Smoking prevalence is down to 43% (2019) from 55% in 1994.
- The Tobacco Industry contributes to 37% of Aboriginal and Torres Strait Islander deaths and causes smoking among 43% of Aboriginal and Torres Strait Islander peoples in Australia.
- Non-smoking has been associated with the social determinants of health (SDOH), including greater socio-economic position and higher educational attainment.
- Regional areas are more likely to be affected by disparities in SDOH including lower employment and reduced access to healthcare (e.g. limited healthcare access, increased appointment wait times).

### What this paper adds

- This is the first study exploring the social determinants of non-smoking and never smoking specifically among Aboriginal and Torres Strait Islander adults living in inner and outer regional areas of Australia.
- This study found that factors associated with a higher prevalence of non- and/or never-smoking include: income, education, food security, mental health, access to healthcare and not experiencing discrimination, consistent with Aboriginal and Torres Strait Islander specific tobacco control research findings.
- This paper recommends targeted and actionable policy directions to support Aboriginal and Torres Strait Islander communities in regional Australia to be smoke-free. Specifically, structural and systemic action on the determinants of health in regional areas will likely lead to substantially improved health outcomes.

available variables. Strengths-based analyses are a preferred approach for Aboriginal and Torres Strait Islander quantitative studies over common deficit-based approaches which focus on the negative problem and 'deficiencies' of individuals. This can actively contribute to a deficit narrative which is in itself harmful.<sup>22,23</sup> Further, this study uses a 'systems' perspective focusing on the broader influences that contribute to smoking prevalence, shifting away from individual blame to solution focused.

## 2.3 | Data sources

The study analysed demographic and smoking-related data from Aboriginal and Torres Strait Islander peoples living in inner or outer regional Australia, as defined by the ASGS Remoteness Structure in the Australian Bureau of Statistics (ABS) 2018–2019 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS).<sup>24</sup> Unit-record data were accessed through the ABS DataLab.<sup>25</sup> Survey participants had consented to the NATSIHS, which included questions about smoking and the SDOH. Non-private dwellings and visitors were not eligible to participate in the survey. The survey methodology is detailed by the ABS.<sup>4</sup>

## 2.4 | Smoking status (outcome variables)

Participants reported being current smokers, ex-smokers or never-smokers. A binary ‘non-smoker’ variable (ex- or never-smokers combined vs. current smokers) and ‘never-smoker’ variable (never-smoker vs. ex- or current smokers combined) was derived for all analyses. The ABS defines never-smoking as a person reporting that they have never regularly smoked, have smoked fewer than 100 cigarettes in their life, and have smoked pipes, cigars, or other tobacco products fewer than 20 times in their life.<sup>4</sup>

## 2.5 | Social determinants of health (exposure variables)

SDOH exposures were determined a priori, based on published literature<sup>1,12,26</sup> and data available within the survey. Using a strengths-based approach, all exposures were coded with the positive variable as the category of interest.<sup>23</sup> These included educational attainment (completing year 10; yes/no); household income grouped into three categories (low, medium, high) based on income deciles reclassified into tertiles of low = 1, medium = 2–4, high = 5–10 (due to the skewed income distribution); experiences of food security: variables of running out and going without food; barriers to accessing healthcare in the last 12 months (barriers, and no barriers to a GP, dentist, other health professional, counsellor or hospital); type of healthcare provider (Aboriginal Medical Service (AMS) or General Practitioner (GP)); use of preferred healthcare provider (whether the usual place of attendance is also the preferred place of attendance); psychological distress using the five-item Kessler psychological distress scale (K5)<sup>27</sup>; and experiences of discrimination (yes/no) (Table 1).

## 2.6 | Statistical analysis

Survey weights were applied to generate estimates weighted to the total Aboriginal and Torres Strait Islander population (regional adults) in 2018.

Prevalence (%), prevalence ratios (PRs) and 95% confidence intervals (CIs) of non-smoking and never-smoking for each exposure were generated using Poisson regression with robust variance. Models were run unadjusted and adjusted for age groups (18–34, 35–54, and  $\geq 55$  years) and sex (male, female). Unadjusted models were also run by sex and age group separately (subgroup analysis, see Appendix S1). Participants with missing data for specific outcomes of interest (for example, education status or income) were excluded from those models. All analysis was undertaken in Stata 16.

## 3 | RESULTS

### 3.1 | Descriptive results

This study analysed data from 2274 Aboriginal and Torres Strait Islander adults in regional Australia (Table 2). Of the sample, 58.8% ( $n = 1337$ ) were female and 41.2% ( $n = 937$ ) were male. This included people who currently smoked (46.4%,  $n = 1054$ ), ex-smokers (25.9%,  $n = 588$ ) and never-smokers (27.8%,  $n = 632$ ). Approximately, half of the sample (53.6%,  $n = 1220$ ) were non-smokers.

Among all participants, approximately one-third (29%) were aged 55 years or older. Approximately, one-quarter of people who were never-smokers (27%) and 37% of people were non-smokers, were 55 years and over. Among people who were never smokers, 65% were female, (and among non-smokers, 60% were female) (Table 2).

### 3.2 | Analytical results

Higher SES showed a strong association with non-smoking and never-smoking (Table 3). Prevalence of non-smoking was significantly higher among participants who finished year 10 or above (PR = 1.34; CI = 1.12–1.61) compared to those who did not complete year 10 or above (59% vs. 46%). Prevalence of never-smoking was also significantly higher among participants who finished year 10 or above (PR = 1.56; CI = 1.20–2.03) compared to those who did not complete year 10 or above (35% vs. 21%).

There was higher prevalence of non-smoking with increasing income levels. A significant increase in non-smoking was seen between low and middle incomes (PR = 1.54; CI = 1.16–2.04) (35% vs. 55%), and also between low and high incomes (PR = 2.07; CI = 1.66–2.57) (35% vs.

**TABLE 1** Demographics, outcomes and exposure definitions (SDOH).

Variables	Definitions
Demographic	
Age	1. 18–34 2. 35–54 3. ≥55
Sex	1. Male 2. Female
Outcomes: Smoking status	
Current smokers	People who currently smoke tobacco
Never-smoking	People who have never smoked according to the ABS definition
Ex-smoking	People who have quit smoking tobacco
Non-smoking	Never- and ex-smoking people combined
Exposures: Social Determinants of Health	
Educational attainment	0. Didn't complete year 10 or any equivalent level of education 1. Completed year 10 or above
Household income	Gross weekly income (tertiles): 0. Lowest category (deciles 1) 1. Middle category (deciles 2–4) NaN. Highest category (deciles 5–10)
Food security	0. Ran out of food and went without 1. Ran out of food in the last 12 months but did not go without NaN. Did not run out of food in the last 12 months
Barriers to accessing healthcare	Barriers to accessing services (during the last 12 months): 0. 1 or more barrier 1. No barriers
Healthcare provision	Where usually go if problem with health: 0. Hospital OR No usual place 1. Aboriginal Medical Service/Community Clinic OR Doctor/ GP Whether usual healthcare provider matches preferred healthcare provider: 0. No 1. Yes
Psychological Distress	Kessler-5 (categorised): 0. High/very high distress (score = 12–25) 1. Low/moderate distress (score = 5–11)
Discrimination	In last 12 months, had experiences of being treated unfairly because Aboriginal and/or Torres Strait Islander: 0. Yes 1. No

71%). Never-smoking prevalence was only significantly greater between lowest versus highest incomes (PR = 2.02; CI = 1.4–2.79) (20% vs. 40%) (Table 3).

There was a significantly higher prevalence of never-smoking among those who had not run out of food in the past 12 months, compared to those that had run out of food and went without (PR = 2.42; 1.48–3.98) (33% vs. 13%).

There was no significant association between food security and non-smoking. In measures of wellbeing, a low-to-moderate K5 distress score was associated with

a greater prevalence of both non-smoking (PR = 1.30; 1.10–1.53) (58% vs. 45%) and never-smoking (PR = 1.56; 1.21–2.01) (33% vs. 21%) when compared to high levels of distress.

There were no non-smoking differences detected between those without barriers to accessing healthcare compared to those experiencing at least one barrier in the last 12 months. However, never-smoking was significantly higher among those without barriers to healthcare compared to those with at least one barrier (PR = 1.46; 1.13–1.88) (34% vs. 24%). This followed a similar pattern among

TABLE 2 Descriptive statistics of sample population (n = 2274).

	n (%)	Current smokers, n (%)	Ex-smokers, n (%)	Never-smokers, n (%)	Non-smokers <sup>a</sup> , n (%)
Age (years)					
18–24	344 (15.13)	161 (15.28)	34 (5.78)	149 (23.58)	183 (15.00)
25–34	486 (21.37)	245 (23.24)	96 (16.33)	145 (22.94)	241 (19.75)
35–44	363 (15.96)	209 (19.83)	75 (12.76)	79 (12.50)	154 (12.62)
45–54	413 (18.16)	218 (20.68)	109 (18.54)	86 (13.61)	195 (15.98)
≥55	668 (29.38)	221 (20.97)	274 (46.60)	173 (27.37)	447 (36.64)
Total	2274 (100)	1054 (100)	588 (100)	632 (100)	1220 (100)
Sex					
Male	937 (41.20)	454 (43.07)	262 (44.56)	221 (34.97)	483 (39.59)
Female	1337 (58.80)	600 (56.93)	326 (55.44)	411 (65.03)	737 (60.41)
Total	2274 (100)	1054 (100)	588 (100)	632 (100)	1220 (100)

<sup>a</sup>Ex-smokers and never-smokers combined.

TABLE 3 Prevalence ratios of non-smoking and never-smoking by exposure category, ADJUSTED for age and sex.

	Non-smokers		Never-smokers	
	%	PR (95% CI)	%	PR (95% CI)
Educational attainment				
Didn't complete year 10 or equivalent	45.90	1.00	20.54	1.00
Completed year 10 or above	58.96	1.34 (1.12–1.61)	35.09	1.56 (1.20–2.03)
Household income				
Lowest category (Decile 1)	34.74	1.00	20.08	1.00
Middle category (Deciles 2–4)	54.55	1.54 (1.16–2.04)	25.93	1.36 (0.93–1.99)
Highest category (Deciles 5–10)	71.16	2.07 (1.66–2.57)	40.21	2.02 (1.46–2.79)
Food security				
Ran out of food and went without	42.87	1.00	13.29	1.00
Ran out of food and did not go without	35.11	0.82 (0.55–1.21)	20.21	1.39 (0.71–2.70)
Did not run out of food	58.73	1.35 (0.98–1.84)	33.06	2.42 (1.48–3.98)
Barriers to accessing healthcare				
1 or more barrier	50.04	1.00	23.62	1.00
No barriers	56.57	1.12 (0.93–1.36)	33.56	1.46 (1.13–1.88)
Healthcare provision				
Whether usual healthcare provider matches preferred healthcare provider				
No	54.92	1.00	29.75	1.00
Yes	50.01	0.93 (0.78–1.11)	27.25	0.92 (0.70–1.21)
Where usually go if problem with health				
Hospital/no usual place	38.71	1.00	20.62	1.00
AMS or GP	55.43	1.38 (1.02–1.86)	30.07	1.49 (0.92–2.40)
Psychological distress				
High/very high distress	44.64	1.00	21.15	1.00
Low/moderate distress	57.58	1.30 (1.10–1.53)	33.09	1.56 (1.21–2.01)
Discrimination				
Has had unfair treatment	48.45	1.00	18.94	1.00
Has not had unfair treatment	53.95	1.12 (0.92–1.36)	31.32	1.59 (1.22–2.06)

people who had been treated unfairly; there was a significantly higher prevalence of never-smoking among people who did not experience unfair treatment (PR = 1.59; 1.22–2.06) (31% vs. 19%), but not non-smoking (PR = 1.12; 0.92–1.36) (54% vs. 48%).

Non-smoking was significantly more likely among those who stated their usual healthcare provider was a GP or AMS (PR = 1.38; 1.02–1.86) (55% vs. 39%) compared to those attending hospital or who had no usual care, while there was no significant association with never-smoking (PR = 1.49; 0.92–2.40) (30% vs. 21%). Usually attended a preferred provider was not significantly associated with smoking outcomes (non-smoking PR = 0.93; 0.78–1.11) (50% vs. 55%); (never-smoking PR = 0.92; 0.70–1.21) (27% vs. 30%). These results are reported in Table 3 and Figure 1.

### 3.3 | Subgroup results

Subgroup analysis showed a generally consistent pattern by sex and age groups, with some key differences. Low psychological distress among females was associated with significantly higher non- and never-smoking compared to females with high/very high psychological distress (PR = 1.36; 1.11–1.67 and PR = 1.59; 1.17–2.15, respectively), but not among males. Having no barriers to accessing healthcare in the last 12 months was associated with never-smoking in males only (PR = 1.73; 1.06–2.82). Similarly, experiencing unfair treatment was associated with never-smoking in the male subgroup (PR = 2.39; 1.32–4.35). Broadly, younger age groups showed stronger associations with exposures. The exception to this is the never-smoking  $\geq 55$  years age group who had no barriers to accessing healthcare, which had the strongest result of the three age groups. The breakdown of subgroup results are detailed in Supplementary tables and figures (Tables S1–S3 and Figures S1–S5).

## 4 | DISCUSSION

This is among the first studies to focus on smoke-free behaviours for Aboriginal and Torres Strait Islander peoples in regional Australia. It moves away from deficit research that focuses on smoking behaviours, to instead take a solution focused, strengths-based approach by exploring what positive exposures influence smoke-free behaviours, to provide better protection from the Tobacco Industry and affiliates.<sup>9,10</sup> The findings highlight the importance of the socio-ecological environment, and the critical importance of structural changes in preventing smoking uptake and upholding the human right to health.<sup>28</sup>

This study found that positive exposure to the SDOH is generally associated with non- and never-smoking, consistent with Aboriginal and Torres Strait Islander-specific tobacco control research<sup>1</sup> and evidence from Indigenous peoples more broadly.<sup>29</sup> Factors that were associated with a higher prevalence of non- and/or never-smoking included: income, education, food security, mental health, access to healthcare and not experiencing discrimination (unfair treatment). There were few observed differences by age and sex, although a larger proportion of the older age-group ( $\geq 55$  years) were smoke-free, which may reflect Tobacco Industry targeting of adolescents, young people<sup>30</sup> and Indigenous peoples.<sup>9,10</sup> The prevalence of current smoking among Aboriginal and Torres Strait Islander peoples living in regional Australia varies significantly from that of urban<sup>31</sup> and remote areas.<sup>8</sup> We did not detect significant associations between several variables (running out of food but not going without, and usual healthcare being equivalent to preferred) and non- or never-smoking. Previous studies have demonstrated a clear association between SES, education, and smoking outcomes<sup>12,13,32</sup> – with a higher median income being associated with non-smoking.<sup>12,31</sup> Both income and education were associated with never- and non-smoking.<sup>12,31</sup> Overall, a clear trend was evident as people with positive SDOH had a higher

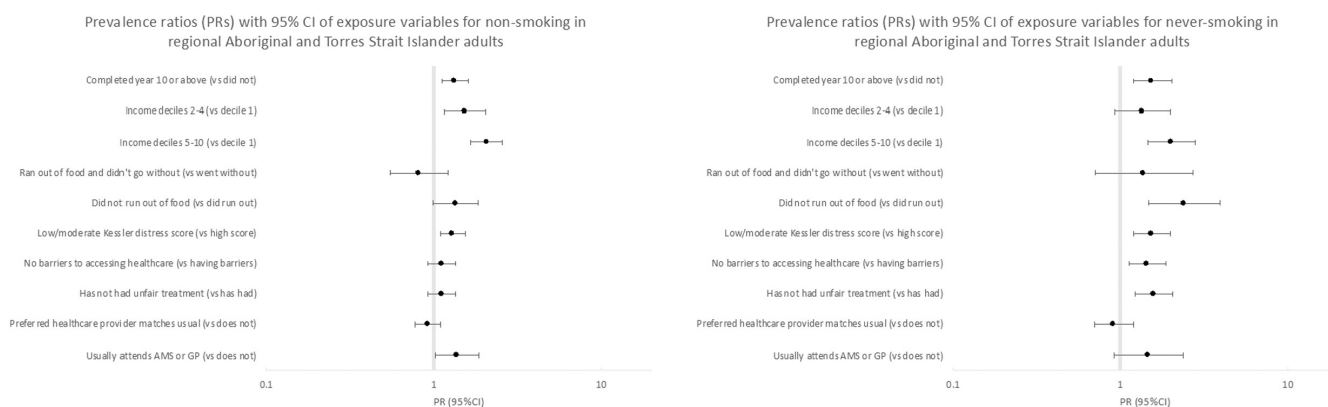


FIGURE 1 Prevalence ratios of non-smoking and never-smoking by exposure category, adjusted for age and sex.

prevalence of never- and non-smoking. Generally, never-smoking showed stronger associations across most exposures, compared to non-smoking.

Consistent with Indigenous worldviews and Relationality, which is grounded in the holistic conception of interconnectedness,<sup>17</sup> we hypothesised that life stability and strong, supportive personal relationships and positive exposure to the SDOH may support smoke-free behaviours. This systematic approach to SDOH has been examined in broader literature,<sup>33</sup> and may be associated with food security. Having a cohesive and supportive environment may buffer against shortfalls and supplement during periods of food insecurity, including where there are local food shortages/price spikes, not just when someone cannot afford food. The effect of a socio-economic gradient in regional areas, as in our study, is consistent with national research.<sup>5,12</sup> Increasing culturally safe and accessible education and income opportunities and supports, such as safe and inclusive schooling, university and employment systems, is required.

Mental health and wellbeing, and experiences of discrimination have been linked to health behaviours.<sup>14,15,34</sup> Evidence indicates that non-smoking is associated with lower levels of psychological distress among Aboriginal and Torres Strait Islander peoples using the K5 score.<sup>27,34</sup> The findings presented here show a similar relationship for non-smoking in regional areas. Having fair treatment and access to healthcare were broadly associated with a higher prevalence of non- and never-smoking. Experiencing discrimination and racism impacts health, including increasing susceptibility of tobacco use.<sup>14,35</sup> This research found that not experiencing discrimination was associated with non-smoking. These findings show that high psychological distress and discrimination are prevalent issues faced by Aboriginal and Torres Strait Islander peoples in regional Australia. Urgent work is required to reduce psychological distress and eliminate discrimination and racism. Actions and policies that actively target discrimination and the deep well of historical and contemporary racism,<sup>36</sup> such as local application of the National Anti-Racism Framework, may help to foster smoke-free behaviours.<sup>37</sup>

We hypothesised that greater healthcare accessibility would increase access to health information, smoking and nicotine cessation supports, and related infrastructure, leading to better smoking outcomes. This could help explain some differences between urban and regional non-smoking behaviours, where there is greater healthcare access and exposure to healthcare in urban areas. The study found that never-smoking was more prevalent among those with accessible healthcare and no barriers in the last 12 months, suggesting healthcare access is a protective factor against smoking uptake and maintaining smoke-free behaviours. Similarly, having a regular

healthcare provider, such as an AMS or GP, was related to non-smoking. Sustaining quit attempts and maintaining smoke-free behaviours may be easier with the accountability and support from regular primary care. There are also ongoing opportunities to increase knowledge and awareness of the benefits of smoking and nicotine cessation, as well as supports through a regular AMS or GP including Medicare Benefits Schedule (MBS) tobacco and nicotine cessation items. This is important in regional areas, where long wait times for medical practitioners are common.<sup>38</sup>

The analysis also identified that SDOH had greater effect among those aged less than 55 years, who yielded larger PRs. This potentially reflects greater dependence and less individual agency and is likely to be a product of time, accumulating life stress and the 'sick quitter' effect (illness prompting quit attempts). In addition, the relevance of some exposures may have changed over time. For example, schooling until year 10 is now a requirement in all Australian jurisdictions,<sup>39</sup> but was previously less common, particularly given the exclusion of Aboriginal and Torres Strait Islander peoples from the education system and the cash economy.<sup>1</sup> As such, social determinants of non- and never-smoking and the ongoing mechanics of settler-colonisation will operate differently over time. This should be explored to better understand the differences observed. Further, each exposure tended to be more prevalent among people who were never-smokers than people who were non-smokers, suggesting a stronger association. This is a product of time and could be related to the environment and supportive systems required to foster a never-smoking environment. Each person is only one slip away from losing 'never smoker' (i.e. not starting smoking regularly) status at the whims of a dynamic and ever predatory Tobacco Industry,<sup>9,10</sup> thus requiring an environment that actively encourages, maintains, and protects smoke-free behaviours.

Approximately, 70% of Aboriginal and Torres Strait Islander peoples who smoke want to quit, and 78% wish they never took up smoking.<sup>40</sup> We also know that the stigma and discrimination experienced by people who smoke can further isolate them from their relations and their community, from which they also draw a shared sense of identity and belonging.<sup>41,42</sup> This highlights the need for structural changes and systemic support, fostering an environment to be free from nicotine dependence. It is imperative to create the conditions necessary (SDOH), for people to stop smoking and mitigate the damage caused by tobacco use. Thus, positive SDOH can help actively foster an environment that encourages being smoke-free – ultimately improving health outcomes. Structural and social pressures to use tobacco have been manufactured through settler-colonisation, and actively perpetuated

by the Tobacco Industry, which profits from the sales of a highly addictive and deadly product.<sup>5,9,10</sup> A substantial shift is required to accelerate smoke-free norms. This includes addressing the SDOH and alleviating structural barriers that continue to perpetuate power imbalances and erode individual agency, self-determination and sovereignty to be free from tobacco and nicotine addiction – as outlined throughout this paper and in exploring the social determinants of being smoke-free.<sup>43</sup>

#### 4.1 | Strengths and limitations

The work was informed and guided by Thiitu Tharmay, who recommended exploring non- and never smoking behaviours among the Aboriginal and Torres Strait Islander population living in regional Australia. This highlights the strength of Aboriginal and Torres Strait Islander-driven research throughout this process. Analysis focused solely on exploring the social determinants of non-smoking among Aboriginal and Torres Strait Islander peoples in regional Australia is particularly important given approximately 44% of the total Aboriginal and Torres Strait Islander population live in regional Australia. This includes a large proportion (40% inner regional and 48% outer regional) of Aboriginal and Torres Strait Islander peoples who smoke daily.<sup>31</sup> Limitations included small sample sizes in subgroup analysis. This likely impacted our ability to detect statistically significant differences, and the cross-sectional nature of the study, limiting our ability to speak to causality. Unlike previous papers, we did not control for income and education, instead considered their impacts as structural exposures/social determinants of health to be explored individually. As SES has a large impact on non-smoking, it is likely that it also influences numerous variables, such as food security, access to healthcare, and attendance to an AMS or GP.

## 5 | CONCLUSION

All Aboriginal and Torres Strait Islander peoples have the right to good health and to live in conditions that support smoke-free behaviours regardless of geography, age and sex. Settler-colonisation actively embedded tobacco use and is sustained by the Tobacco Industry, accounting for 37% of Aboriginal and Torres Strait Islander deaths.<sup>6</sup> Reducing smoking prevalence is everybody's business, with significant opportunities to reduce tobacco-related disease and death by acting on the determinants of smoking to promote smoke-free norms. This includes fostering higher incomes, educational attainment, wellbeing, as well as healthcare access. Addressing the

SDOH, including discrimination and racism, through structural and systemic change is expected to assist in accelerating non-smoking behaviours, and consequently improve health outcomes.

#### AUTHOR CONTRIBUTIONS

**Christina Heris:** Conceptualization; data curation; investigation; formal analysis; writing – review and editing; methodology; project administration; supervision; visualization. **Reuben Z. Caudell:** Investigation; writing – original draft; methodology; data curation; visualization. **Eden M. Barrett:** Conceptualization; investigation; methodology; validation; data curation; supervision; writing – review and editing; visualization. **Makayla-May Brinckley:** Writing – review and editing; data curation. **Rubijayne Cohen:** Writing – review and editing; data curation. **Michelle Kennedy:** Writing – review and editing; data curation; visualization; funding acquisition. **Lisa J. Whop:** Writing – review and editing; data curation; funding acquisition. **Tom Calma:** Writing – review and editing; data curation; visualization. **Raglan Maddox:** Writing – review and editing; conceptualization; methodology; software; data curation; supervision; resources; project administration; funding acquisition; visualization.

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#### CONFLICT OF INTEREST STATEMENT

The authors have no conflicts to declare.

#### ETHICS STATEMENT

Aboriginal and Torres Strait Islander peoples were involved in the design, analysis, interpretation and dissemination of findings as detailed above. This is consistent with the National Health and Medical Research Council

Values and Ethics Guideline conducting ethical research with Aboriginal and Torres Strait Islander peoples. This study was also conducted under the Australian National University HREC protocols 2019/654 and 2017/013. Additional ethical approval details are available upon request.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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