The decline of smoking initiation among Aboriginal and Torres Strait Islander secondary students: implications for future policy

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Abstract

Objective: Smoking is a major cause of preventable illness for Aboriginal and Torres Strait Islander people, with most commencing in adolescence. Understanding trends in youth tobacco use can inform prevention policies and programs.

Methods: Logistic regression models examined smoking trends among Aboriginal and Torres Strait Islander and all students aged 12–17 years, in five nationally representative triennial surveys, 2005–2017. Outcomes measured lifetime, past month, past week tobacco use and number of cigarettes smoked daily (smoking intensity).

Results: Aboriginal and Torres Strait Islander students' never smoking increased (2005: 49%, 2017: 70%) with corresponding declines in past month and week smoking. Smoking intensity reduced among current smokers (low intensity increased 2005: 67%, 2017: 77%). Trends over time were similar for Aboriginal and Torres Strait Islander students as for all students (8-10% annual increase in never smoking).

Conclusions: Most Aboriginal and Torres Strait Islander students are now never smokers. Comparable declines indicate similar policy impact for Aboriginal and Torres Strait Islander and all students.

Implications for Public Health: Comprehensive population-based tobacco control policies can impact all students. Continued investment, including in communities, is needed to maintain and accelerate reductions among Aboriginal and Torres Strait Islander students to achieve equivalent prevalence rates and reduce health inequities.

Key words: tobacco, adolescent health, Aboriginal and Torres Strait Islander people, smoking

Tobacco use is the leading preventable cause of illness and death and the largest contributing risk factor to the gap in health outcomes between Aboriginal and Torres Strait Islander people and non-Indigenous Australians.[1] High smoking prevalence in Aboriginal and Torres Strait Islander people is an enduring legacy of colonisation, which saw tobacco included in rations during settlement and social disadvantage entrenched through government policies.[2] Consequently, Aboriginal and Torres Strait Islander people are overrepresented in the socioeconomic groups with higher prevalence and a greater normalisation of smoking.[3]

The past five decades has seen Australia implement a comprehensive population-level approach to tobacco control that includes price measures, standardised packaging with graphic health warnings, smoke-free legislation, advertising restrictions and social marketing campaigns.[4] From the late 2000s tailored interventions for Aboriginal and Torres Strait Islander people have also been implemented including targeted social marketing and locally delivered community programs.[5] It is in this context that substantial declines in daily smoking prevalence among Aboriginal and Torres Strait Islander adults have been observed (2004–05: 50%; 2018-19: 40%)[6,7] as well as significant increases in never smoking in 15–24 year olds (44% in 2002 to 56% in 2014–15).[8]

As half Aboriginal and Torres Strait Islander people aged 18–24 years who smoke started smoking daily when aged 15–18 years, and a quarter before age 15 years,[8] further prevention of initiation and transition to established smoking is important to reducing tobacco related health inequities with non-Indigenous Australians. Understanding smoking trends in earlier adolescence is vital for tailoring prevention policies.

The Australian Secondary School Students' Alcohol and Drug Survey (ASSAD) is currently the only national data source on tobacco use among Aboriginal and Torres Strait Islander adolescents aged 12–14 years and the largest sample of adolescents aged 12–17 years. Using standard methods and measures since 1984 ASSAD allows for analysis of smoking trends covering a period of substantial tobacco control policy change in Australia.

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Previous ASSAD analysis found smoking prevalence among Aboriginal and Torres Strait Islander students declined between 1996 and 2005, with current (past week) smoking decreasing from 27% to 17% in 12–15-year-olds and from 44% to 33% in 16–17-year-olds.[9]

We extend that work[9] to first explore if smoking prevalence in Aboriginal and Torres Strait Islander secondary students aged 12–17 years has changed between 2005 and 2017; then to determine if any observed changes were steady over time; and if there were different effects for demographic sub-groups or in the total ASSAD sample.

Methods

ASSAD study

ASSAD is a national, triennial (1984-2017) survey of self-reported tobacco, alcohol and other drug use among Australian secondary school students. Sampling and survey administration have been described previously.[9,10] Briefly, ASSAD surveys use stratified two-stage probability sampling to randomly select secondary schools in states and territories (excluding schools smaller than 100 students), stratified by education sector (government, independent and Catholic), and then select students within schools. Separate school samples are drawn for years 7-10 and 11-12. Researchers work with participating schools to select approximately 80 students across year levels. From 2011, class-based sampling was used with participating schools identifying non-selective classes to participate. School response rates have declined from 63% in 2005 to 17% in 2017.[9,10]

Principals give permission for the survey to be conducted in schools. Passive parental consent was gained for student participation unless active consent was required by specific states or schools. Researchers administered the survey on school premises and students completed questionnaires anonymously. State and school policies determined teacher presence during survey administration, and this has not been found to meaningfully affect results.[10]

Ethics and approvals

Ethical approval was gained from the Cancer Council Victoria Human Research Ethics Committee (HREC1013) and registered with the University of Melbourne HREC (1953771).

Measures

Indigenous Status

Aboriginal and Torres Strait Islander students self-identified by answering 'Yes' to the question "Are you of Aboriginal or Torres Strait Islander descent?" with options: No; Yes – Aboriginal descent; Yes – Torres Strait Islander descent; Yes – both Aboriginal and Torres Strait Islander descent.

Smoking Experience

We used binary measures of smoking experience: never smoking (not even a puff of a cigarette in their lifetime); past month smoking (any number of cigarettes smoked in the previous four weeks); current smoking (having smoked cigarettes in the previous seven days). Students with missing smoking data were excluded (1% of the total sample, 2% Aboriginal and Torres Strait Islander students).

Smoking Intensity

Students reported the number of cigarettes smoked on each of the preceding seven days, and average number smoked per day was calculated for current smokers. Due to substantial skewness in the data, this measure was categorised into three groups: 1–4 cigarettes, 5–9 cigarettes and 10 or more cigarettes per day, based on definitions of light and heavy smoking for adolescents.[11,12]

Demographics

Demographic measures of age (12–15; 16–17; 12–17); sex (male, female); location (urban, non-urban based on school postcode and the 2016 ASGS classification); socioeconomic status tertiles (low, middle, high; based on school postcode using SEIFA Index of Relative Socioeconomic Disadvantage (IRSD) in the most recent year, 2005 – SEIFA 2001, 2008 – SEIFA 2006, 2011-2014 – SEIFA 2011, 2017 – SEIFA 2016).

Statistical analysis

We used data from the 2017, 2014, 2011, 2008, 2005 ASSAD surveys. Analyses were focused on the sample of Aboriginal and Torres Strait Islander students. We used logistic regression with unweighted data to compare smoking prevalence in 2005 with each subsequent survey year and to model change in smoking prevalence between consecutive survey years. Models were repeated for each age, gender, location, and SES sub-group. We ran similar models to examine trends for each smoking intensity category. The interaction between time (survey year as a linear variable) and location and SES group was evaluated for each smoking outcome to determine whether change over time was consistent across these groups. Models adjusted for covariates of education sector (government, Catholic, independent); state/territory, age (continuous), sex, remoteness (five category) and SES were included in all models. Simple categorical variables were used for sub-group analyses (such as the 12–15 and 16–17 age groups or urban/non-urban categories), however, where possible continuous variables or more granular categorical variables were used as covariates in adjusted models to preserve information from the original data. We report adjusted odds ratios (ORs) and 95%CIs adjusted for within-school clustering. We used STATA MP 14.2 for all analyses.

Using survey year as a continuous time measure the regression analyses were extrapolated to estimate annual change in likelihood of never, past month, and current smoking separately for the total ASSAD sample and the Aboriginal and Torres Strait Islander sub-sample. Finally, change in prevalence between 2005 and 2017 and this difference as a proportion of baseline prevalence (2005) was calculated to further compare rates of change over time. These 95% CIs were calculated manually using the sum of the standard errors (SE) of the 2005, 2017 estimates for the difference, and the relative risk SE formula for the relative change.

To provide context for the results, analyses were repeated for the total ASSAD sample of 12–17-year-olds, which includes Aboriginal and Torres Strait Islander students. As the two samples are not independent, we did not make statistical comparisons.

Results

Sample characteristics

Aboriginal and Torres Strait Islander students aged 12–17 years accounted for 4% (n=887) of the 2005 ASSAD sample, 5% (n=1,284) in 2008, 5% (n=1,242) in 2011, and 6% (n=1,225) in 2017. Characteristics of Aboriginal and Torres Strait Islander students surveyed are shown in Table 1. In 2017, 38% of Aboriginal and Torres Strait Islander students attended schools in urban locations, and 53% schools in areas of lower social advantage.

Smoking behaviour among Aboriginal and Torres Strait Islander students

Never smoking among Aboriginal and Torres Strait Islander students increased between 2005 and 2017 with corresponding declines in past month and current smoking (Table 2 and Supplementary File 2). In 2017, 70% of students aged 12–17 years had never smoked (76% of younger students aged 12–15 years; 55% of older students aged 16–17 years), a significant increase from 49% in 2005 ($p<0.001$). Past month smoking decreased significantly ($p<0.001$) from 24% in 2005 to 14% in 2017, with similar reductions in current smoking (21% to 10%) (Figure 1, Supplementary File 1). In 2017, 18% of older students and 7% of younger students currently smoked (Supplementary File 2).

For Aboriginal and Torres Strait Islander students aged 12-17 the likelihood of never smoking was significantly higher in 2017 than in 2005 (OR 2.93 [2.40, 3.58] $p<0.001$) and at least 2.5 times higher odds ($p<0.001$) were found in each age, sex, location and SEIFA subgroup (Table 2). There was an overall trend of increased never smoking with each consecutive survey year for all sub-groups although the increase between 2011-2014 was not significant. The largest increase in the likelihood of never smoking for 12–17-year-olds was between 2005 and 2008 (OR 1.54 [1.27, 1.87] $p<0.001$). The likelihood of past

Table 1: Sample characteristics of Aboriginal and Torres Strait Islander secondary school students 12–17 years in 2005, 2008, 2011, 2014, 2017 by age, gender, location and SEIFA index.

	12 to 15 years					16 to 17 years					12 to 17 years				
	2005	2008	2011	2014	2017	2005	2008	2011	2014	2017	2005	2008	2011	2014	2017
Total ASSAD (n)	14,725	16,364	15,814	15,769	12,433	7,180	8,252	9,098	7,529	6,997	21,905	24,616	24,912	23,298	19,430
Indigenous (n)	**673**	**1,023**	**898**	**1,037**	**899**	**214**	**261**	**344**	**314**	**326**	**887**	**1,284**	**1,242**	**1,351**	**1,225**
% Males	47%	47%	52%	50%	44%	52%	61%	56%	54%	49%	49%	50%	53%	51%	46%
% Urban	47%	36%	42%	40%	33%	49%	52%	45%	42%	49%	48%	39%	43%	40%	38%
% Low SEIFA	39%	46%	43%	37%	56%	40%	52%	30%	41%	47%	39%	47%	39%	38%	53%
% Middle SEIFA	36%	36%	35%	37%	30%	28%	25%	41%	30%	35%	34%	34%	37%	35%	31%
% High SEIFA	25%	17%	23%	26%	14%	32%	23%	29%	30%	18%	26%	19%	24%	27%	15%

Table 2: Never smoking among students aged 12–17 years, by gender, age, SEIFA index, location, 2005–17.

	2005		2008		2011		2014		2017		
	% (n)	OR [ref]	% (n)	OR [2008 cf 05] (95% CI)	% (n)	OR [2011 cf 08] (95% CI)	% (n)	OR [2014 cf 11] (95% CI)	% (n)	OR [2017 cf 14] (95% CI)	OR [2017 cf 05] (95% CI)
Overall ASSAD student sample 12–17											
12–17	63% (13,772)	1	71% (17,265)	1.51*** (1.40, 1.62)	75% (18,404)	1.30*** (1.21, 1.41)	79% (18,225)	1.28*** (1.18, 1.40)	81% (15,497)	1.20*** (1.09, 1.32)	**3.01*** (2.76, 3.29)**
Aboriginal & Torres Strait Islander students 12–17											
Age group											
12–17	49% (424)	1	60% (755)	1.54*** (1.27, 1.87)	62% (757)	1.25* (1.05, 1.48)	64% (847)	1.08 (0.91, 1.29)	70% (843)	1.41*** (1.17, 1.69)	**2.93*** (2.40, 3.58)**
12–15	53% (352)	1	64% (645)	1.62*** (1.30, 2.01)	69% (604)	1.27* (1.04, 1.54)	68% (695)	1.00 (0.82, 1.23)	76% (665)	1.51*** (1.22, 1.88)	**3.12*** (2.49, 3.90)**
16–17	34% (72)	1	43% (110)	1.33 (0.88, 2.02)	45% (153)	1.27 (0.88, 1.83)	49% (152)	1.26 (0.91, 1.73)	55% (178)	1.16 (0.85, 1.58)	**2.46*** (1.68, 3.62)**
Sex (12–17)											
Males	49% (208)	1	60% (377)	1.51** (1.16, 1.98)	63% (406)	1.25 (1.00, 1.55)	65% (435)	1.10 (0.87, 1.38)	71% (387)	1.45** (1.12, 1.87)	**2.99*** (2.24, 3.99)**
Females	48% (214)	1	60% (368)	1.53** (1.17, 2.01)	62% (347)	1.27 (0.98, 1.65)	63% (399)	1.08 (0.83, 1.40)	69% (434)	1.38* (1.06, 1.79)	**2.89*** (2.20, 3.80)**
SEIFA (12–17)											
Low	48% (156)	1	58% (324)	1.58** (1.15, 2.17)	62% (295)	1.07 (0.82, 1.39)	59% (296)	1.10 (0.82, 1.48)	72% (458)	1.75*** (1.30, 2.34)	**3.23*** (2.32, 4.50)**
Med	50% (143)	1	62% (251)	1.64** (1.20, 2.25)	64% (281)	1.35* (1.02, 1.79)	68% (318)	1.01 (0.77, 1.32)	69% (259)	1.12 (0.82, 1.54)	**2.51*** (1.82, 3.47)**
High	49% (108)	1	56% (122)	1.33 (0.87, 2.05)	61% (178)	1.49 (0.99, 2.25)	65% (233)	1.07 (0.72, 1.57)	67% (125)	1.33 (0.88, 2.00)	**2.81*** (1.84, 4.30)**
Region (12–17)											
Urban	50% (207)	1	60% (293)	1.47* (1.09, 1.97)	62% (322)	1.23 (0.94, 1.61)	67% (356)	1.18 (0.88, 1.58)	69% (312)	1.30 (0.97, 1.74)	**2.76*** (2.05, 3.72)**
Non-Urban	48% (205)	1	59% (404)	1.58** (1.22, 2.04)	63% (432)	1.26* (1.01, 1.57)	62% (491)	1.01 (0.80, 1.28)	71% (530)	1.51** (1.18, 1.93)	**3.04*** (2.31, 4.00)**

Notes:
****p<0.001; **p<0.01; *p<0.05*

month and current smoking was significantly lower in 2017 than 2005 for 12–17-year-olds overall (OR 0.45 [0.34, 0.60] $p<0.001$, OR 0.36 [0.27, 0.48] $p<0.001$, respectively) and across all sub-groups, except for past month smoking among high SEIFA students (OR 0.68 [0.40, 1.16] $p=0.158$). However, the change between consecutive survey years was generally not significant for different sub-groups (Supplementary File 2). There was no significant interaction between location and time for any measure of smoking experience, indicating no changes were detected over time in never ($p=0.859$), past month ($p=0.345$) and current smoking ($p=0.427$) between urban and non-urban residential areas. Similarly, no changes over time were detected between SEIFA tertiles (never: $p=0.571$; past month: $p=0.594$; current: $p=0.614$). See also Supplementary File 2.

Smoking behaviour among the total ASSAD sample

The changes in smoking prevalence at the total ASSAD sample level was similar to the Aboriginal and Torres Strait Islander student sub-group. In the total sample aged 12–17 years, never smoking was significantly more common in 2017 (81%) than 2005 (63%) (OR 3.01 [2.76, 3.29] $p<0.001$) with significant decreases in past month (OR 0.52 [0.46, 0.58] p<0.001) and current smoking (OR 0.46 [0.40, 0.52] $p<0.001$) (Table 2 and Supplementary File 2).

Comparison in rate of change: total ASSAD and Aboriginal and Torres Strait Islander students

The average annual rate of change in prevalence of never smoking, past month smoking and current smoking was similar for the two groups (Table 3). Specifically, the odds of never smoking increased significantly by 8–10% with each year for both groups (Aboriginal and Torres Strait Islander students: OR 1.08 [1.07, 1.10] $p<0.001$; total ASSAD: OR 1.10 [1.09, 1.10] $p<0.001$), while the odds of past month and current smoking decreased significantly by 6-7% ($p<0.001$) with each year (Table 3).

Between 2005 and 2017 the proportion of never smokers increased by 22% for the Aboriginal and Torres Strait Islander students and 17% in the total sample. The relative increase in never smoking was larger for Aboriginal and Torres Strait Islander students (45% vs 28%), due to the lower baseline prevalence of never smoking in 2005 in the total sample. While the absolute decline in prevalence of past month and current smoking was greater for Aboriginal and Torres Strait Islander students (10% past month, 11% current) than for the total ASSAD sample (5% past month, 4% current), when change was considered as a proportion of those smoking at 2005, the decrease was similar for both groups (Table 3).

Figure 1: Smoking experience among Aboriginal and Torres Strait Islander and all students aged 12-17 years, ASSAD 2005-17.

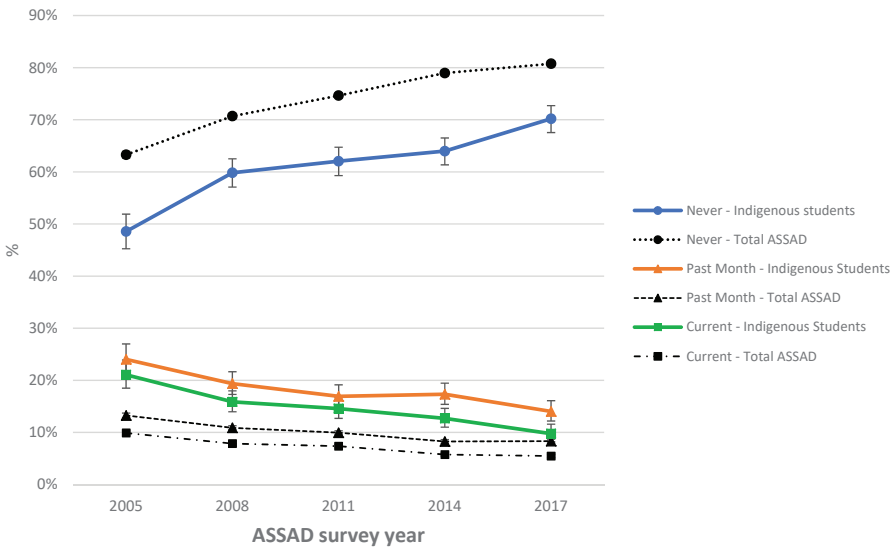

Table 3: Change in never, past month and past week smoking prevalence among students aged 12–17 years, 2005–17.

		Average annual change in likelihood of smoking (OR)	Total change in prevalence 2005–17 (% (95% CI))	Total relative change in prevalence 2005–17, as a proportion of prevalence at 2005 (%)
Never smoking	Indigenous Students	1.08 (1.07, 1.10)	22% (17%, 26%)	45% (37%, 52%)
	Total ASSAD	1.10 (1.09, 1.10)	17% (17%, 18%)	28% (26%, 29%)
Past month	Indigenous Students	0.94 (0.93, 0.96)	-10% (-13%, -7%)	-42% (-60%, -23%)
	Total ASSAD	0.94 (0.94, 0.95)	-5% (-6%, -4%)	-37% (-43%, -31%)
Current	Indigenous Students	0.93 (0.93, 0.95)	-11% (-14%, -8%)	-54% (-75%, -32%)
	Total ASSAD	0.94 (0.93, 0.95)	-4% (-5%, -4%)	-45% (-52%, -38%)

Note:
Average annual change calculated using logistic regression (adjusted for age, sex, state, school type, remoteness, SEIFA)

Smoking intensity among Aboriginal and Torres Strait Islander students

Aboriginal and Torres Strait Islander current smokers aged 12–17 years generally smoked at low intensity (1–4 cigarettes per day), and the proportion smoking at this level increased significantly between 2005 (67%) and 2017 (77%)(OR 1.96 [1.04, 3.68] $p=0.036$). Correspondingly, smoking at higher intensities declined over the same period (5–9 cigarettes daily, 2005: 18%; 2017: 12%, OR 0.56 [0.27, 1.15] $p=0.116$; 10 or more cigarettes daily, 2005: 15%; 2017: 12%, OR 0.55 [0.23, 1.32] $p=0.178$), although this was not statistically significant likely due to the low numbers in these categories. These changes varied over time with the largest between 2011 and 2014 (1-4 cigarettes, OR 2.04 [1.19, 3.48] $p=0.009$; 10 or more cigarettes, OR 0.45 [0.21, 0.99] $p=0.048$).

Discussion

This first study to examine smoking trends among Aboriginal and Torres Strait Islander students aged 12–17 years between 2005 and 2017 found it is increasingly likely these students have never smoked a cigarette and less likely to currently smoke. Taken with

previous findings,[9] our results demonstrate continued decline in current (weekly) smoking over the past 20 years in both younger adolescents (aged 12–15 years, 1996: 27%; 2017: 7%) and older adolescents aged 16–17 years (1996: 44%; 2017: 18%). Encouragingly these declines have been accompanied by substantial increases in the proportion who have never smoked in the same period for both age groups (aged 12–15 years, 39% to 76%; aged 16–17 years, 22% to 55%).

In extending previous work[9] we demonstrate the ongoing declines in youth smoking in the context of more than two decades of comprehensive tobacco control in Australia including peak investment in national social marketing, graphic health warnings on packaging, increased smoke-free legislation, the introduction of tobacco plain packaging from 2012 and annual excise increases from 2013.[4,13-15] The period covered by the current study also encompasses the 2008 Council of Australian Governments' (COAG) *Closing the Gap Strategy* and the target to halve the daily smoking rate among Aboriginal and Torres Strait Islander adults by 2018, along with targeted social marketing campaigns, the introduction of the *Tackling Indigenous Smoking and Healthy Lifestyle Program* (TISHLP) in 2010 and its revised tobacco focused model in 2015, *Tackling Indigenous Smoking* (TIS).[5,13,16] These measures introduced in recognition of tobacco's direct contribution to health inequities.[17] Over this period local community level tobacco control has been prioritised through TISHLP and TIS,[18] an approach considered best practice.[2,19,20] A 2018 evaluation of TIS suggests it will contribute to a reduction in smoking (although no empirical evidence of the impact of the program on prevalence is yet available).[18]

These investments and policy measures coincide with the significant increases in never smoking and declines in smoking prevalence we have reported among Aboriginal and Torres Strait Islander students. Our findings reflect other ASSAD analyses that showed substantial reduction in smoking for all secondary students in the total ASSAD sample (which includes Aboriginal and Torres Strait Islander students) between 1999 and 2008, and a slowing of progress in more recent years to 2017 as youth smoking overall reaches low levels.[10] However, in our study smoking prevalence among Aboriginal and Torres Strait Islander students aged 12–17 years continued to decline over this period. Our results are also consistent with other studies with Aboriginal and Torres Strait Islander adolescents and adults, and agree with the likely impact the comprehensive approach combining whole of population and targeted or community level strategies has had on young people in particular.[6,8]

There have been substantial changes to tobacco control funding and programs over the study period. In addition to removing the broader healthy lifestyles elements from TISHLP to focus on tobacco in the TIS program, funding has been reduced for TIS and to Aboriginal health generally, the Australian National Preventive Health Agency closed, there were no national mainstream social marketing campaigns since 2012 and limited periods of targeted campaigns.[21-25] While funding for TIS has been committed to 2021–22, the 2018 evaluation noted that coverage was incomplete and recommended complementary measures to support local tobacco control, such as national campaigns.[18] The fluctuations in adolescent smoking decline may reflect these changes, with limited national campaign activity representing a substantial lost opportunity to accelerate declining smoking trends.[26,27] Our results strengthen calls for increased investment in tobacco control to maintain progress,[6] particularly among socially disadvantaged high prevalence communities. Previous work has shown that intense periods of tobacco control decreased youth smoking prevalence consistently across all SES groups, but during low investment periods smoking increased overall, particularly in the more socially disadvantaged students.[28]

Importantly, between 2005 and 2017 trends in never, past month and current smoking among Aboriginal and Torres Strait Islander students generally followed those of the total ASSAD sample. Although the increase in never smoking and smoking declines were greater for Aboriginal and Torres Strait Islander students, this reflects their different starting points. When considered as a proportion of baseline prevalence, the rate of change in smoking by year is similar for Aboriginal and Torres Strait Islander students and the total sample, suggesting current policies have been similarly effective for all students. While reducing smoking at a similar rate is positive, this outcome is not equitable and reflects a continuing gap in health outcomes. Specifically, never smoking prevalence remains lower among Aboriginal and Torres Strait Islander adolescents than in the broader population, and current smoking remains twice as high. This pattern is also observed in other countries with a similar history of colonisation[29] and is related to how Aboriginal and Torres Strait Islander young people, and other First Nations adolescents globally, share similar influences for smoking uptake to the broader population, but are also more likely to be exposed to these influences, including smoking among family and community, and life stressors.[30]

As has been noted for the adult population in Australia, reducing the gap in disease burden requires maintaining and intensifying the most effective tobacco control measures to accelerate smoking declines among Aboriginal and Torres Strait Islander populations such that health outcomes are equivalent to the broader population.[4,6] While it is difficult to identify independently effective components from Australia's comprehensive tobacco control program, our results demonstrate that the current approach is having an impact and should be sustained.[6] To achieve this goal, evidence from First Nations populations globally, including Australia, indicates that comprehensive population-wide approaches, including price measures, smoke-free legislation and social marketing, are important alongside community-led, strengths-based programs as these are best placed to address the contextual factors influencing higher smoking prevalence.[2,19,20,30,31]

Two findings from this study may inform future policy and program design as part of a comprehensive approach. These relate to price measures and the target age range and objectives for prevention interventions. Firstly, our study found the prevalence of heavier smoking started to decline in Aboriginal and Torres Strait Islander students around 2014. This period corresponds to the introduction of tax-driven changes in cigarette prices, measures shown to reduce smoking and prompt quit attempts, including among young people and socially disadvantaged sub-groups.[32,33] This period also saw a proliferation of actions by tobacco companies designed to counter increasing prices, including many that may have been aimed at young smokers (increased brands and variants, small pack and roll-your-own pack sizes).[32,34] The decline in smoking prevalence and smoking intensity found in our study post 2014 suggests that the

actions taken by the tobacco industry did not completely mitigate impact of tax rises on smoking behaviours of Aboriginal and Torres Strait Islander adolescents.

Secondly, while the proportion of 12–17-year-old Aboriginal and Torres Strait Islander students who had ever experimented with cigarettes in 2017 had reduced to 30% from 50% in 2005, this still represents a substantial proportion of students at risk of regular smoking. Further, the quarter of 12–15-year-olds who had already tried smoking highlights the importance of the early secondary years for prevention. These findings reinforce the self-reported age of initiation of Aboriginal and Torres Strait Islander young adults, most of whom commenced regular smoking before age 18 years and a quarter before 15 years,[8] and are in line with the early adolescence initiation recorded with Indigenous young people of North America.[35,36]

We found that in 2017 18% of 16–17-year-olds were already smoking at least weekly. Youth prevention programs have a role to play in not only minimising transition to regular smoking, but also in providing age appropriate quit support. While some young Aboriginal and Torres Strait Islander people do not perceive traditional cessation supports to be relevant to them,[37] ABS data shows an interest in quitting with more than a third of Aboriginal and Torres Strait Islander smokers aged 15–17 years having made a quit attempt.[7,38] There may be opportunities to deliver relevant prevention programs in community and/or school settings. While the evidence for school-based interventions is mixed there are indications that programs that include a focus on developing self-efficacy skills are more likely to be effective than information-only programs.[39,40]

Limitations

A potential limitation to generalising our results is the representativeness of the achieved ASSAD sample. Characteristics of the Aboriginal and Torres Strait Islander sub-sample are broadly consistent with national population data, including the proportion of 12–17-year-olds identifying as Aboriginal or Torres Strait Islander in the 2006, 2011 and 2016 Censuses (4%, 5% and 5%, respectively)[41-43] and the higher proportions of students from areas of greater social disadvantage.[5] However, it was more urban than the national population distribution, with greater proportions of Aboriginal and Torres Strait Islander students participating from schools in major cities, 39% in 2008 ASSAD, 40% in 2014 and 38% in 2017, compared with 32% living in major cities in 2008, 35% on 2014-15 and 37% in 2016,[44,45] reflecting exclusion of smaller schools. There were no significant differences between urban and non-urban areas, however, the higher smoking prevalence often found for more remote areas might be missed in ASSAD data, which may not include students attending some types of remote schools.[44]

In addition, recruitment challenges led to substantially lower proportions of participants from the Northern Territory and South Australia in 2017 than in previous surveys. However, when these states were excluded from analyses, results were similar to those reported from the final models. While school response rates have declined over the study period there is no evidence that there is a meaningful difference in smoking behaviours between schools that do or do not participate.[46] Finally, ASSAD includes only adolescents currently attending school. As school attendance and engagement is associated with lower levels of smoking, our results might underestimate prevalence.[47]

Conclusions and implications for public health

Few national studies have examined smoking among Aboriginal and Torres Strait Islander people in early adolescence, a key period for smoking initiation. This study extends recent findings of increased never smoking and reduced smoking prevalence among Aboriginal and Torres Strait Islander adolescents and young adults, and the total ASSAD sample. Importantly the findings demonstrate increased never smoking for all demographic sub-groups including those living in non-urban areas and experiencing greater social disadvantage. Although similar trends were found for both the Aboriginal and Torres Strait Islander students and the total ASSAD sample, suggesting parallel policy impact across all students, current smoking remained substantially higher demonstrating a persisting gap in smoking outcomes. Along with slower progress during periods of lower intensity tobacco control, continuing higher prevalence of smoking highlights the need for sustained or greater investment to accelerate increases in never smoking and improve health equity. Resourcing strengths-based Aboriginal community-controlled programs should remain a priority as part of comprehensive, population-wide strategies.

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Supporting Information

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

Supplementary Table 1: Estimates of proportions of never, past month and current smokers (and 95% confidence intervals) for Aboriginal and Torres Strait Islander students 12-17, and the total ASSAD sample, 2005-2017.

Supplementary File 2: Additional data for never, past month and past week smoking and smoking intensity for Aboriginal and Torres Strait Islander Students 12-17; demographic and geographic sub-group comparisons.

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