

A review of evidence on the prevalence of and trends in cigarette and e-cigarette use by Aboriginal and Torres Strait Islander youth and adults

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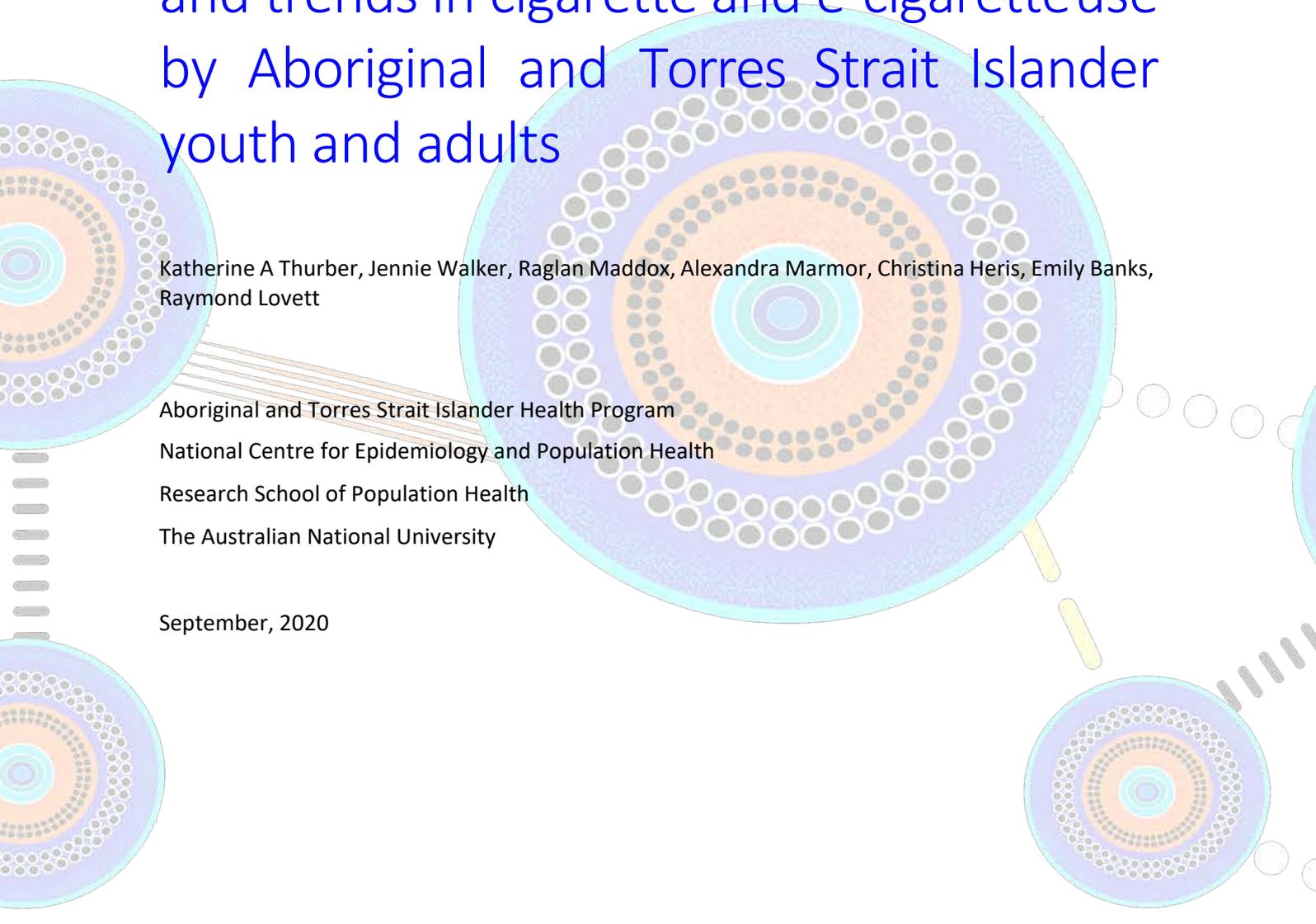
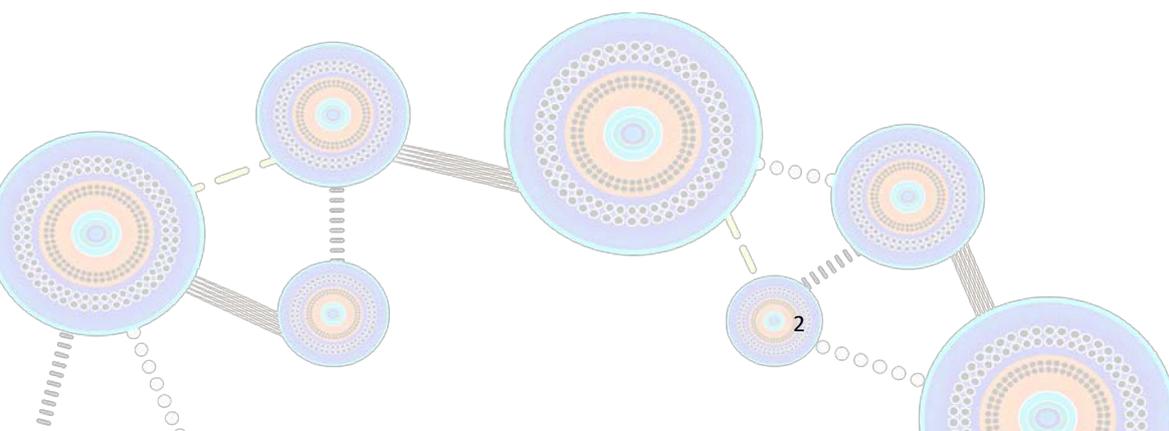


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Executive Summary

This report was commissioned by the Australian Government Department of Health to review the evidence on tobacco smoking and e-cigarette use among Aboriginal and Torres Strait Islander peoples in Australia. The objective was to describe current patterns of cigarette and e-cigarette use, and trends in cigarette smoking prevalence.

The most recent, population-based, representative estimates of smoking prevalence, and the first estimates of e-cigarette use, are available from the 2018/19 Aboriginal and Torres Strait Islander Health Survey, published by the Australian Bureau of Statistics (ABS). To analyse trends in cigarette smoking prevalence, data are drawn from nationally-representative ABS cross-sectional surveys conducted between 1994 and 2018/19. This report also includes evidence on youth smoking prevalence and trends based on the Australian Secondary Students' Alcohol and Drug Survey (ASSAD), conducted between 1996 and 2017.

All findings presented in this report are specific to Aboriginal and Torres Strait Islander peoples, unless specified otherwise. We humbly acknowledge and respect that Aboriginal and Torres Strait Islander peoples are diverse and constitute many nations, cultures, language groups, perspectives, and experiences.

Key findings

In 2018/19, one-third of Aboriginal and Torres Strait Islander adults had never smoked. The remaining two-thirds of adults were either current tobacco smokers (40.2% smoke daily and 3.1% smoke less frequently) or past smokers (24.0%). This constitutes over 300,000 adults at risk of smoking-related morbidity and mortality.

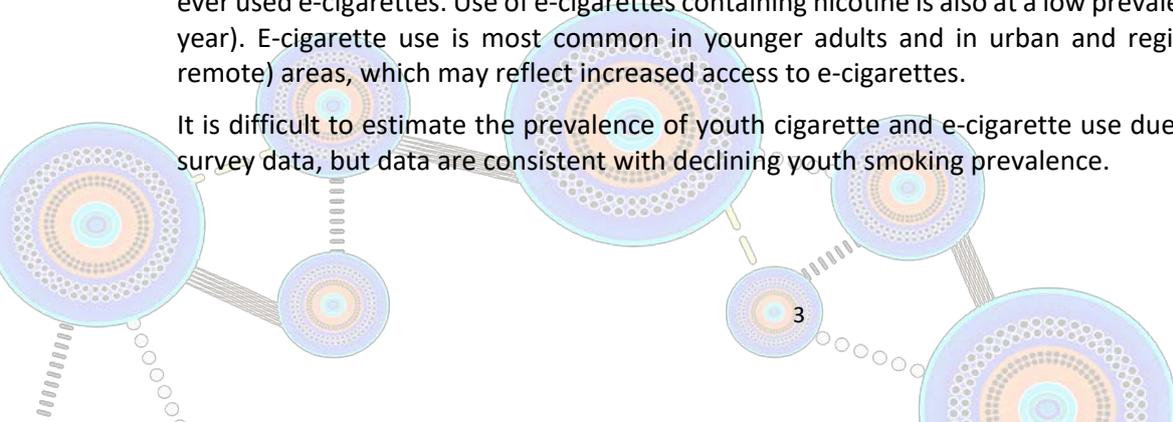
Colonial processes introduced and entrenched commercial tobacco use in the population.¹ The continued disempowerment of Aboriginal and Torres Strait Islander peoples in social and political systems contributes to the maintenance of this high smoking prevalence.¹

There have been substantial and significant reductions in cigarette smoking prevalence among adults over the past decade. Current smoking prevalence (combining daily smoking and less-than-daily smoking) decreased by 11.1 percentage points from 1994 to 2018/19, from 54.5% to 43.3%. Daily smoking prevalence decreased by 10.7 percentage points from 2002 to 2018/19, from 50.9% to 40.2%.

- Substantial reductions are observed for younger adults, with relatively less progress observed among older age groups. It is critical to continue to focus on accelerating reductions in smoking prevalence for younger adults, complemented by increased efforts to reduce smoking prevalence for older adults.
- Substantial reductions are observed in major cities and in regional areas. The majority of current smokers live in regional settings. In remote areas, there was a significant increase in less-than-daily smoking prevalence from 2002 to 2018/19, and no observable change in daily smoking prevalence. There is a clear need to maintain focused efforts on reducing smoking in regional areas and in major cities; accelerating reductions in regional settings will have the largest impact in terms of reducing the absolute numbers of smokers. This needs to be paired with increased efforts and funding to initiate smoking prevalence reductions in remote settings.

Around 1% of Aboriginal and Torres Strait Islander adults currently use e-cigarettes; a total of 8% have ever used e-cigarettes. Use of e-cigarettes containing nicotine is also at a low prevalence (3% in the past year). E-cigarette use is most common in younger adults and in urban and regional (compared to remote) areas, which may reflect increased access to e-cigarettes.

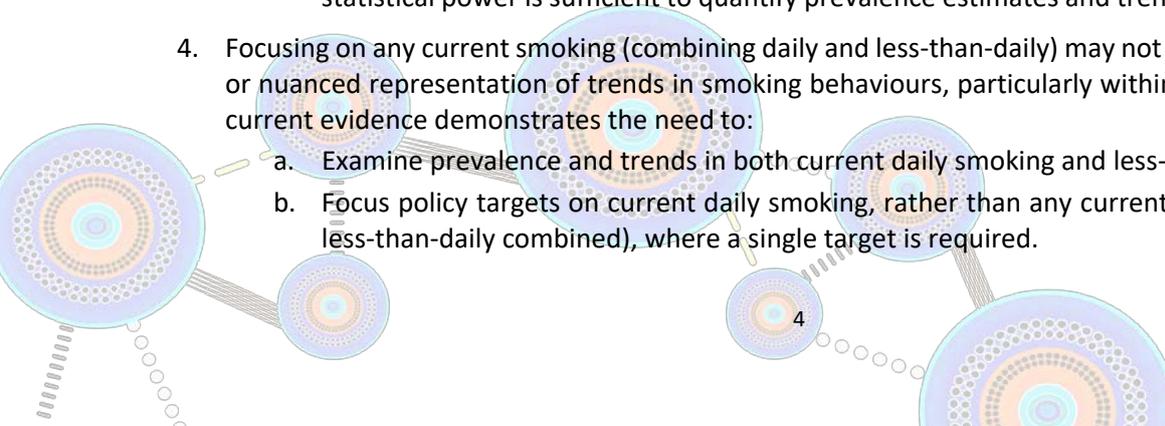
It is difficult to estimate the prevalence of youth cigarette and e-cigarette use due to biases in existing survey data, but data are consistent with declining youth smoking prevalence.



Estimates of prevalence drawn from ABS surveys are likely to underestimate the true extent of youth cigarette and e-cigarette use. The vast majority of youth responses were collected by adult proxy or with an adult present in the room, and our findings indicate that data collected in that context are unlikely to be valid. Accordingly, trend analyses of youth smoking prevalence using these data are unlikely to be valid. The current best available evidence, drawn from the Australian Secondary Students' Alcohol and Drug Survey (ASSAD), indicates that in 2017 less than a quarter of 12-15-year-olds and less than half of 16-17-year-olds had ever smoked cigarettes. This represents a marked reduction from 1996, when the respective prevalences were 61% and 78%. However, estimates from this survey may not be generalisable to the total Aboriginal and Torres Strait Islander youth population. This survey likely underestimates smoking prevalence because it does not capture youth who are not attending school, or who live in very remote areas, which are groups with high smoking prevalence.

Implications for data collection, policy targets, and reporting

1. The Aboriginal and Torres Strait Islander smoking epidemic is distinct from the non-Indigenous smoking epidemic. Further, there is great diversity within the Aboriginal and Torres Strait Islander population. The current evidence demonstrates the need to:
 - a. Create explicit interim targets specific to Aboriginal and Torres Strait Islander smoking prevalence within the Long Term National Health Plan target of reducing smoking prevalence in the total Australian population below 10 per cent by 2025.
 - b. Create specific smoking reduction targets for Aboriginal and Torres Strait Islander adults in major cities, regional areas, and remote areas, as well as having a single target for all Aboriginal and Torres Strait Islander adults, to more accurately reflect diverse structures and needs, and the divergent trends in smoking prevalence.
2. We identified a substantial potential for bias when youth smoking data is collected by an adult proxy or with an adult present, compared to self-reported by youth on their own. This is not an issue restricted to Aboriginal and Torres Strait Islander health surveys; it is also likely to impact on total population surveys. The current evidence demonstrates the need to:
 - a. Conduct an in-depth evaluation of the extent of bias introduced by collecting data on youth smoking behaviours with adults present.
 - b. Acknowledge the limitations in any use of data collected by this method, and exercise particular caution in using these data to measure progress against targets.
 - c. Assess the suitability of available data sources for measuring and monitoring national prevalence and trends in youth cigarette and e-cigarette use.
 - d. Improve the validity of data on youth smoking behaviours, such as by having youth self-report their smoking and e-cigarette behaviours confidentially.
3. Combining major cities and regional areas obscures differences in trends between these two groups, and underestimates the progress that is occurring within major cities. The current evidence demonstrates the need to:
 - a. Report data separately for major cities, regional areas, and remote areas (rather than presenting data for all 'non-remote' areas combined), to more accurately reflect the diverse contexts, including smoking behaviours, health and wellbeing infrastructure, and social and economic opportunities.
 - b. Ensure data collections adequately sample remote and very remote settings, to ensure statistical power is sufficient to quantify prevalence estimates and trends for these groups.
4. Focusing on any current smoking (combining daily and less-than-daily) may not provide an accurate or nuanced representation of trends in smoking behaviours, particularly within remote areas. The current evidence demonstrates the need to:
 - a. Examine prevalence and trends in both current daily smoking and less-than-daily smoking.
 - b. Focus policy targets on current daily smoking, rather than any current smoking (daily and less-than-daily combined), where a single target is required.



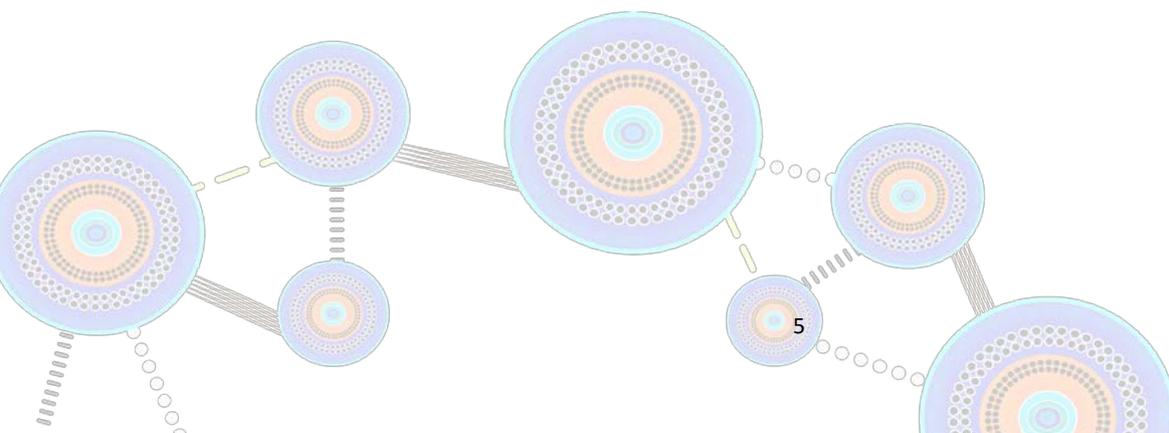
5. There is a diverse and evolving range of e-cigarette products, which carry unique risks. The current evidence demonstrates the need to:
 - a. Ask comprehensive and harmonised questions about a range of e-cigarette products and patterns of use.
 - b. Conduct timely monitoring of trends in the use of these products.

Implications for further research

More rigorous evidence about what works to reduce smoking prevalence is required. An evaluation of the effectiveness of the Tackling Indigenous Smoking regional grants program is underway, and will contribute to this body of evidence. An ongoing framework for monitoring and evaluating this national policy would contribute to the generation of timely evidence and continuous quality improvement.

Work is underway to quantify the mortality risks from past and current smoking specific to Aboriginal and Torres Strait Islander people, and the contribution of smoking to mortality at the population level. The current evidence demonstrates the value of:

1. Modelling future trends in smoking behaviours, in order to project likely changes over time and outcomes under different tobacco control scenarios. If combined with estimates of mortality risks specific to Aboriginal and Torres Strait Islander peoples (from research underway), these models could predict potential lives saved if reductions in smoking prevalence were accelerated.
2. Support for research to understand the national prevalence of youth cigarette and e-cigarette use through:
 - a. The improvement of Aboriginal and Torres Strait Islander data collections, as above;
 - b. Examining the generalisability of findings drawn from the ASSAD data;
 - c. Publication of analyses of e-cigarette use in ASSAD data; and,
 - d. Exploring the potential to apply population-weighting methods and/or to generate a synthetic population using existing longitudinal data assets (e.g. Mayi Kuwayu: the national study of Aboriginal and Torres Strait Islander wellbeing).
3. Support for research examining how e-cigarette use interacts with cigarette use (e.g. as a smoking cessation tool and/or as a gateway to cigarette use), and examining factors that predict youth and adults use of cigarettes and e-cigarettes, to inform targets for intervention. This could be achieved through a combination of analysis of ABS cross-sectional survey data and longitudinal data from the Mayi Kuwayu Study and the national Longitudinal Study of Indigenous Children (LSIC).



Introduction

This report is underpinned by the *United Nations Declaration on the Rights of Indigenous Peoples* (UNDRIP) and the *Framework Convention on Tobacco Control* (FCTC). We acknowledge that ‘Indigenous peoples have the right to self-determination’.^{2, p.4} We recognise the disproportionate harm caused by commercial tobacco to Indigenous peoples.³ We acknowledge the complexity of tobacco use and tobacco related behaviours, such as initiation, smoking, attitudes, quit attempts, cessation and second-hand smoke exposure. Consequently, we consider Aboriginal and Torres Strait Islander smoking prevalence trends within the contexts of enduring and evolving cultures and societies, historical and contemporary trauma, tobacco industry interference, and the social and cultural determinants of health.

Aboriginal and Torres Strait Islander peoples bring tremendous vibrancy to our world, constituting many nations and cultures. Within such diversity, Aboriginal and Torres Strait Islander peoples share a common history of colonisation.⁴⁻⁶ It is important to understand the mechanisms through which the high prevalence of tobacco use has been established and endured.⁴ These include colonial forms of oppression, such as the forced removal and relocation of Aboriginal and Torres Strait Islander peoples from their land, removal of Aboriginal and Torres Strait Islander peoples’ children, and use of commercial tobacco as a form of payment prior to engagement with the cash economy.⁷ This contextualisation is crucial in better understanding tobacco and e-cigarette use among Aboriginal and Torres Strait Islander peoples in Australia.

Tobacco use is the leading contributor to the burden of disease for Aboriginal and Torres Strait Islander peoples, and as such, tobacco use is an area with substantial potential for health improvement.⁸ Reducing tobacco use is beneficial at any age, with smoking cessation improving health and quality of life. Further, smoking cessation reduces the risk of premature death, compared to continuing to smoke.⁹

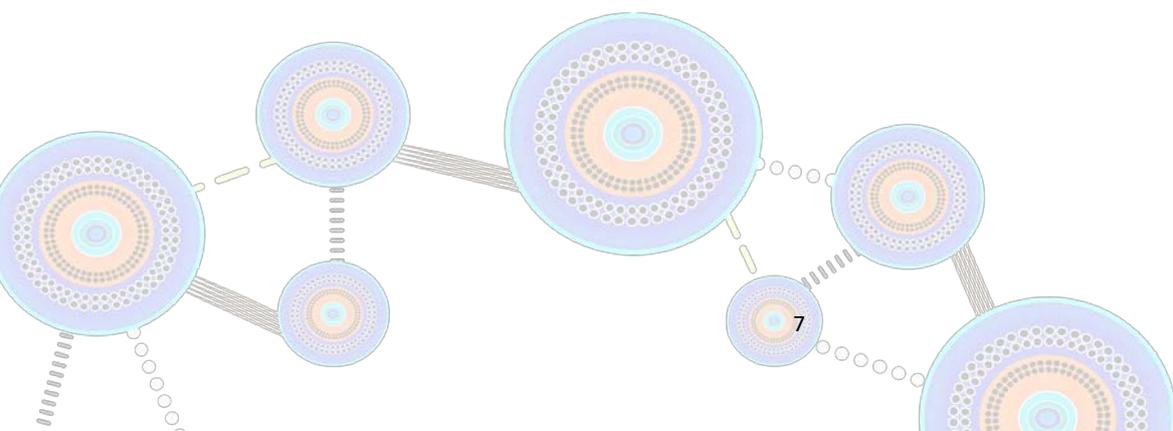
Reductions in smoking prevalence are achievable. Substantial progress has been made in recent decades.^{10,11} This is encouraging, and further reductions in tobacco use will continue to enhance the health and wellbeing of Aboriginal and Torres Strait Islander peoples. The implementation and evaluation of tobacco control measures requires precise monitoring of trends in smoking behaviours. The utility of data on smoking prevalence is underpinned by its validity. Several Aboriginal and Torres Strait Islander and total Australian population targets have been set in relation to youth, adult, and/or overall smoking prevalence (see Table 1 for some examples). Most of these targets are assessed using smoking prevalence data from Australian Bureau of Statistics (ABS) health and social surveys. The aims of this report are to assess the quality of data informing estimates of Aboriginal and Torres Strait Islander smoking prevalence, and to provide an up-to-date assessment of smoking prevalence and trends by age group, sex, and remoteness.

Table 1. Examples of recent policy targets around Aboriginal and Torres Strait Islander smoking prevalence

Policy and Target	Current assessment
Implementation Plan for the Aboriginal and Torres Strait Islander Health Plan, 2012-23¹²	
By 2023, 9% of Aboriginal and Torres Strait Islander youth aged 15–17 smoke tobacco (any current smoking).	On track
By 2023, 91% of Aboriginal and Torres Strait Islander youth aged 15–17 have never smoked.	On track
By 2023, 52% of Aboriginal and Torres Strait Islander adults aged 18-24 have never smoked.	On track
By 2023, 40% of Aboriginal and Torres Strait Islander adults aged 18 and over smoke tobacco (any current smoking). This is based on the prevalence age-standardised to the 2001 Australian Standard Population.	On track
Australia’s Long Term National Health Plan¹³	
By 2025, achieve a smoking prevalence below 10% for the total Australian population (age group not specified; definition of smoking prevalence not specified). There is no explicit mention of Aboriginal and Torres Strait Islander smoking prevalence within currently available Strategy documents.	Not yet assessed
National Tobacco Strategy, 2012-2018¹⁴	
By 2018, reduce the daily smoking prevalence among all Australian adults (18 and over) from 19.1% (age-standardised) in 2007-08 to 10%.	Not achieved
By 2018, halve the daily national smoking prevalence among Aboriginal and Torres Strait Islander adults (18 and over) from 47.7% (age-standardised: 44.8%) in 2008.	Not achieved

Ethics

The conduct of ABS surveys is approved under the Census and Statistics Act 1905. Ethics approval for the current analysis of ABS data was granted by the Australian National University (Protocol: 2017/013). Other statistics cited in this report are drawn from published estimates.



Cigarette and e-cigarette use by Aboriginal and Torres Strait Islander adults

Methods

Data sources

We analysed data from existing national cross-sectional surveys of the Aboriginal and Torres Strait Islander population conducted by the Australian Bureau of Statistics (ABS), using Confidential Unit Record Data Files accessed through ABS DataLab. This includes a total of seven surveys conducted between 1994 and 2018/19, including the 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS), the 2002 National Aboriginal and Torres Strait Islander Social Survey (NATSISS), the 2004/05 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS), the 2008 NATSISS, the 2012/13 NATSIHS, the 2014/15 NATSISS, and the 2018/19 NATSIHS. All data sources and results presented are specific to the Aboriginal and Torres Strait Islander population. These surveys provide the most population-representative data about Aboriginal and Torres Strait Islander peoples nationally, noting some exclusions to survey scope. There are additional differences in survey design and implementation that may contribute to differences in findings across surveys.

Table 2. Information on ABS Aboriginal and Torres Strait Islander Health and Social surveys, 1994 to 2018/19

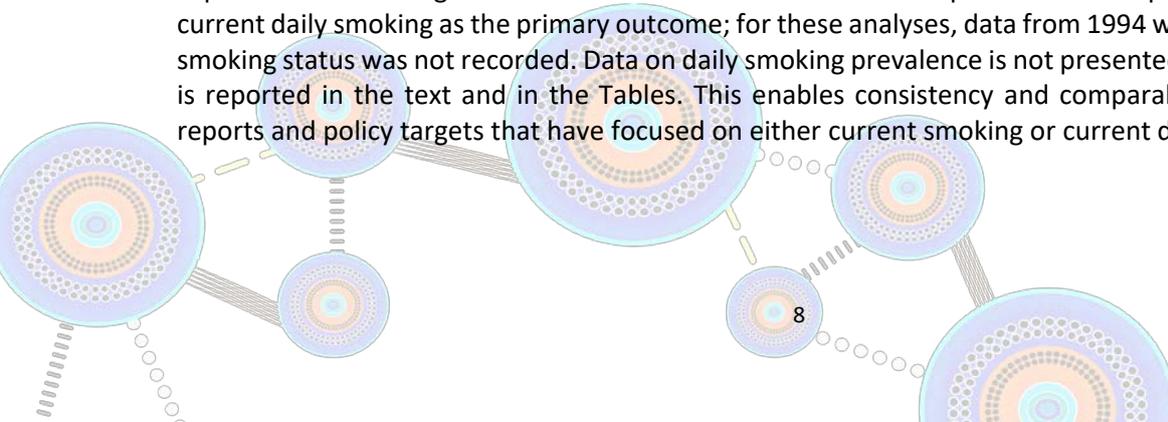
Year	Survey	Categorisation of smoking status	Remoteness categorisation	Data on e-cigarette use
1994	NATSIS ¹⁵	Smoker (includes packet and roll-your-own); not smoker; not stated.	Major cities, inner regional, outer regional, remote, very remote	No
2002	NATSISS ¹⁶	Current smoker – regular (at least one smoke per day; ‘daily’) or occasional (less than one smoke per day, on average; ‘less-than-daily’); ex-smoker (includes all who are not a current smoker but were ever a daily smoker); never-smoker; not stated. Includes smoking tobacco (manufactured and roll-your-own), cigars and pipes; excludes chewing tobacco.	Major cities, inner regional, outer regional, remote, very remote	No
2004/05	NATSIHS ¹⁷	Current smoker – daily or less frequent; ex-smoker (includes all who are not a current smoker but had ever smoked daily or had smoked cigarettes ≥100 times or other tobacco products ≥20 times); never-smoker.	Major cities, inner regional, outer regional, remote, very remote	No
2008	NATSISS ¹⁸	As in 2004/05.	Non-remote, remote and very remote	No
2012/13	NATSIHS ¹⁹	As in 2004/05.	Non-remote, remote and very remote	No
2014/15	NATSISS ²⁰	As in 2004/05.	Non-remote, remote and very remote	No
2018/19	NATSIHS ²¹	As in 2004/05.	Major cities, inner regional, outer regional, remote, very remote	Yes

Due to the survey questions asked in 1994, current daily smokers cannot be separated from current less-than-daily smokers. The change in categorisation starting in 2004/05 results in adults being categorised as ex-smokers who would have been categorised as never-smokers under the previous definition.

Variables

Cigarette use

The primary outcome was current tobacco smoking, which included daily smoking as well as less-than-daily smoking. This outcome was used to enable inclusion of data from all survey years; this information is presented in the Figures and in the text and Tables in this Report. We also repeated analyses with current daily smoking as the primary outcome; for these analyses, data from 1994 was excluded as daily smoking status was not recorded. Data on daily smoking prevalence is not presented in the Figures, but is reported in the text and in the Tables. This enables consistency and comparability with previous reports and policy targets that have focused on either current smoking or current daily



smoking. For survey years where 'not stated' was a response category, this category is included in the denominator but data for this category are not presented.ⁱ

E-cigarette use

In the 2018/19 survey, participants were asked if they had ever used any e-cigarette (vape) products. Those who had ever used e-cigarettes were asked if they were current users of e-cigarettes; this included participants who reported using e-cigarettes daily or weekly. Participants were also asked if they had used an e-cigarette containing nicotine within the last year;ⁱⁱ responses were categorised as 'have used', 'have not used', 'form refused', 'not stated', and 'don't know'.

Demographic variables

Sex was categorised as male or female, based on self-reported responses.

The term adult is used to refer to all persons aged 18 years and above. Age was categorised as 18-24, 25-34, 35-44, 45-54, 55-64, and ≥65 years. Broader age groups of 18-24, 25-44, and ≥45 years are used where required to ensure adequate cell sizes.

Remoteness is defined by Australian Statistical Geography Standard (ASGS) remoteness areas. This categorisation is designed as a measure of relative access to services, as indicated by road distance to service centres.²² Previous ABS and other reports have examined data by two categories, 'non-remote' (encompassing major cities, inner regional, and outer regional areas) and 'remote' (encompassing remote and very remote areas). Where data allow, we have presented data by three categories – (1) major cities, (2) inner and outer regional areas, and (3) remote and very remote areas – to enable examination of variation within the 'non-remote' group and to more accurately reflect the respective contexts and nuanced smoking behaviours. However, as shown in Table 2, data were not available for major cities and regional areas separately for three survey years: 2008, 2012/13, and 2014/15. The remoteness data are suppressed in the Confidentialised Unit Record Files (CURFs) for these surveys due to small numbers and the sensitive nature of the data. For these three survey years, we have presented data overall, stratified by age group, and stratified by sex, and for remote areas, but we are unable to present data for the major cities or regional area category. Customised microdata files would be required to enable analysis by further disaggregated remoteness categories for these survey years.

Statistical analysis

We conducted repeat cross-sectional analysis of smoking prevalence in these nationally representative datasets. We weighted all prevalence estimates and 95% confidence intervals (CIs) to the total in-scope Aboriginal and Torres Strait Islander adult population, using replicate weights provided by the Australian Bureau of Statistics (ABS). We also estimated the absolute numbers of persons with each outcome of interest (rounded to the nearest thousand), which reflects the total number of people nationally (within the in-scope population) with that outcome. The delete-a-group jackknife replication method was employed in all analyses.

We calculated the absolute percent change in smoking prevalence between survey years, that is, the change in percentage points. Standard Errors (SEs) for the prevalence change were approximated according to the formula $SE(x-y)=[SE(x)^2+SE(y)^2]^{1/2}$. These SEs were used to calculate 95% CIs. Two-sided p-values were based on the prevalence difference and associated SEs to test significance at the 0.05 level.²³

The change in current smoking (daily and less-than-daily combined) prevalence was calculated for 1994 to 2018/19. The change in current smoking, current daily smoking, and current less-than-daily smoking prevalence was calculated for 2002 to 2018/19.

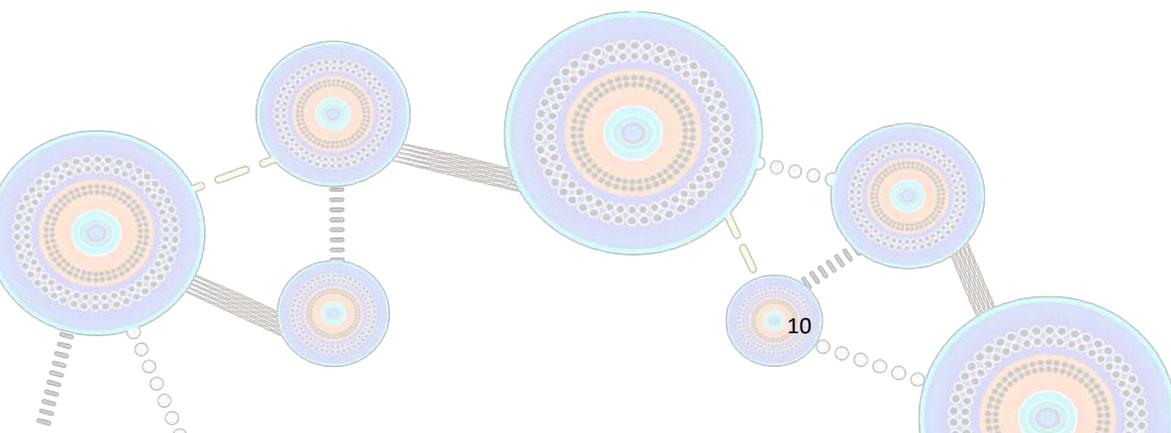
All analysis was based on data where the number of individuals (based on the unweighted data) in a cell was ten or greater. To avoid small cells, original variable categories were aggregated into broader

ⁱ If respondents who did not state their smoking status are likely to be smokers, including this group in the non-smoker category may underestimate actual smoking prevalence; however, the magnitude of any bias is likely to be low, given the small proportion of responses of 'not stated'.

ⁱⁱ In Australia it is currently illegal to sell e-cigarettes containing nicotine. However, in the current policy and retail environment, people who use e-cigarettes may not be aware of whether a product contains nicotine; some products that are labelled as 'nicotine free' may include nicotine.

categories (e.g. broader age groups were used).

Data were analysed using Stata 16, in ABS DataLab. Prevalence changes and surrounding SEs and CIs were calculated in Microsoft Excel 2016.



Results: adult cigarette use

Adult tobacco smoking behaviours in 2018/19

In 2018/19, one-third (32.7%; 95%CI: 30.4,35.0) of adults had never smoked; this corresponds to 159,000 adults. 43.3% (41.1,45.6) were current smokers: 40.2% (37.9,42.5) were current daily smokers, and 3.1% (2.3,4.0) were less-than-daily smokers (Table 4). This corresponds to 211,000 adults who currently smoked in 2018/19 – 196,000 of whom smoked daily, and 15,000 who smoked less frequently. One quarter of the adult population (24.0; 22.0,25.9) were past smokers, corresponding to 116,000 adults.

Trends in adult smoking prevalence, 1994-2018/19

Trends in adult smoking prevalence, overall

Adult current smoking (including daily and less-than-daily) prevalence decreased from 54.5% in 1994 to 43.3% in 2018/19 (Figure 1; Table 3). This represents a 11.1 (7.5,14.7) percentage point decrease in adult smoking prevalence. Despite the significant and substantial decrease in smoking prevalence over this period, the absolute number of adult smokers increased from 104,000 in 1994 to 211,000 in 2018/19 (Table 3) reflecting the growing population.

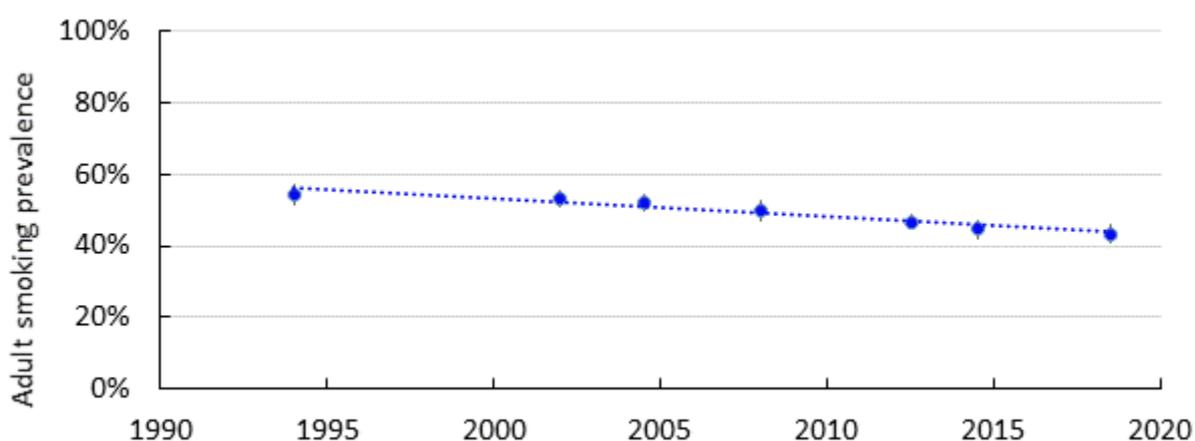


Figure 1. Aboriginal and Torres Strait Islander adult current (daily and less-than-daily combined) smoking prevalence, 1994-2018/19

A similar trend is observed when focusing on smoking patterns from 2002 to 2018/19. Daily smoking prevalence decreased from 50.9% in 2002 to 40.2% in 2018/19 (Table 4). This represents a 10.7 (7.2,14.2) percentage point decrease in daily smoking prevalence over this period. Over this same period, less- than-daily smoking prevalence changed from 2.3% to 3.1%; this reflects a non-significant increase of 0.9 (-0.2,2.0) percentage points. Together, this results in a change in current smoking prevalence (combining daily and less-than-daily smoking) decrease of 9.8 percentage points (6.4,13.2) between 2002 and 2018/19.

Trends in adult smoking prevalence, by age group

Between 1994 and 2018/19, there was a significant decrease in current smoking prevalence for the age groups 18-24 years and 25-34 years (Figure 2; Table 3). The prevalence of current smoking among those aged 18-24 years was 55.4% in 1994 and 39.5% in 2018/19, representing a 15.8 (8.6,23.1) percentage point decrease in smoking prevalence over the period. For adults aged 25-34 years, current smoking prevalence decreased by 15.3 (8.5,22.2) percentage points, from 62.7% to 47.3%.

For adults aged 35-44 years, current smoking prevalence changed from 56.4% in 1994 to 49.8% in 2018/19, representing a non-significant prevalence reduction of 6.7 (-0.4,13.8) percentage points. For adults aged 45-54 years, current smoking prevalence changed from 49.0% to 44.9%, a non-significant prevalence reduction of 4.1 (-3.8,12.0) percentage points. The prevalence for adults \geq 65 years was 25.2% in 1994 and 21.1% in 2018/19, representing a non-significant decrease of 4.1 percentage points (-15.8,7.5).

Among adults aged 55-64 years, current smoking prevalence changed from 36.5% in 1994 to 45.9% in 2018/19, representing a non-significant increase of 9.4 (-3.9,22.7) percentage points.

The absolute number of smokers in each age group was higher in 2018/19 compared to 1994, despite prevalence changes, due to population growth. In 2018/19, there were 42,000 current smokers aged 18-24 years, 56,000 aged 25-34 years, 42,000 aged 35-44 years, 37,000 aged 45-54 years, 26,000 aged 55-64 years, and 8,000 aged ≥65 years.

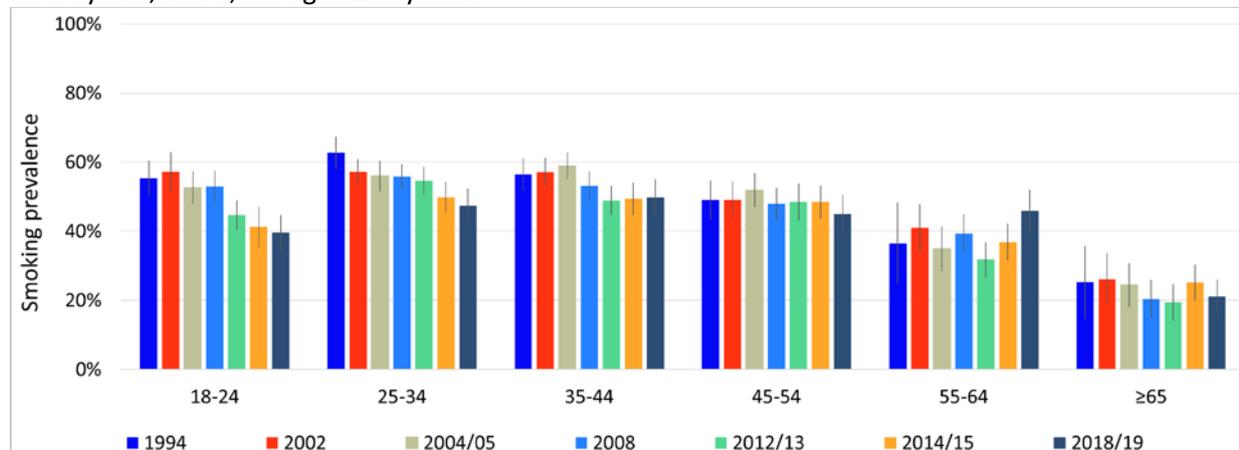


Figure 2. Aboriginal and Torres Strait Islander current (daily and less-than-daily combined) smoking prevalence, by age group and survey year, 1994-2018/19

When focusing on the years 2002 to 2018/19 (Table 4), we observe significant declines in current daily smoking prevalence among younger age groups (18-24, 25-34, and 35-44 years). There was a non-significant decrease in current daily smoking prevalence among those aged 45-54 years and among those aged 65 years or older. Among those aged 55-64 years, there was a non-significant prevalence increase of 4.2 percentage points (-5.2,13.5; from 38.6% to 42.8%). Across age groups, there was no significant change in less-than-daily smoking prevalence.

Trends in adult smoking prevalence, by sex

In 1994, smoking prevalence was high among both males and females, but prevalence was significantly higher for males (58.4%; 54.7,62.1 compared to 50.9%; 48.0,53.9). The observed decline in smoking prevalence between 1994 and 2018/19 was of a similar magnitude for males and females. Among male adults, current smoking prevalence decreased from 58.4% in 1994 to 45.7% in 2018/19, an absolute prevalence reduction of 12.7 (7.5,17.9) percentage points (Figure 3; Table 3). Among female adults, current smoking prevalence decreased from 50.9% in 1994 to 41.1% in 2018/19. This represents a 9.8 (5.7,13.9) percentage point decrease in smoking prevalence for female adults. In 2018/19, there were 107,000 male current smokers and 104,000 female current smokers.

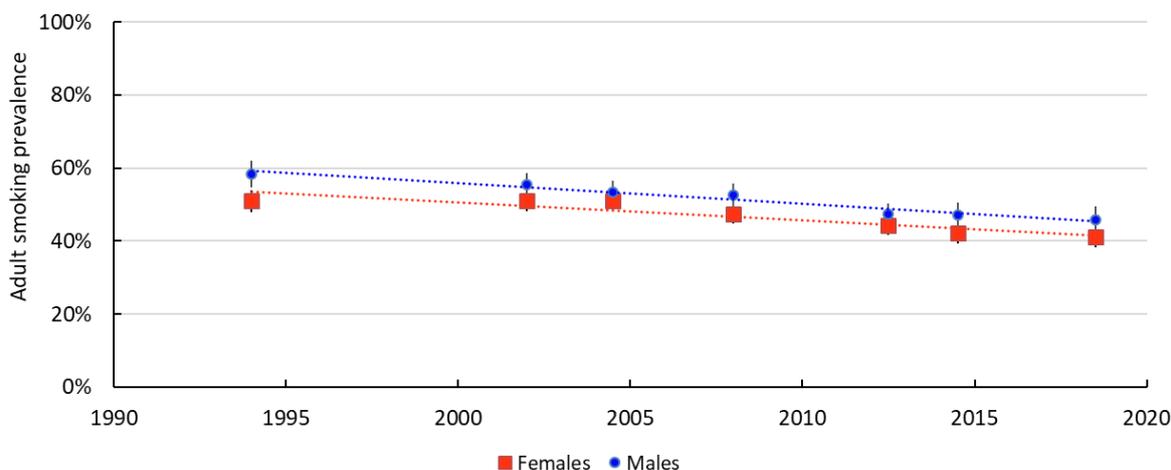


Figure 3. Aboriginal and Torres Strait Islander current (daily and less-than-daily combined) adult smoking prevalence by sex, 1994-2018/19

Similar patterns emerge for the 2002 to 2018/19 period (Table 5). For males, current daily smoking prevalence decreased from 53.2% in 2002 to 41.9% in 2018/19, a decrease of 11.3 (6.4,16.2) percentage points. This was offset by a 1.6 (-0.2,3.4) percentage point increase in the prevalence of less-than-daily smoking. Together, this resulted in a decrease in current smoking (daily and less-than-daily combined) prevalence of 9.7 (4.9,14.5) percentage points for males over the period. Trends were similar for females. There was a 10.2 (6.2,14.2) percentage point decrease in the prevalence of current daily smoking, 48.8% in 2002 to 38.6% in 2018/19. There was no significant change in the prevalence of less-than-daily smoking for females (2.3% in 2002 to 2.5% in 2018/19; increase of 0.2; -1.0,1.4 percentage points). This resulted in a 10.0 (5.9,14.0) percentage point decrease in female current smoking (daily and less-than-daily combined) prevalence over the period.

Trends in adult smoking prevalence, by remoteness

In 1994, current smoking prevalence was similar across major cities (54.4%; 47.8,61.0), regional areas (54.7%; 50.3,59.1), and remote areas (54.3%; 50.9,57.7). Trends between 1994 and 2018/19 varied across settings, with a significant prevalence reduction in major cities and regional areas, and a significant prevalence increase in remote areas (Figure 4; Table 3).

Current smoking prevalence in major cities decreased by 22.5 percentage points (14.8,30.2) over the period, down to 31.8% (27.8,35.9) in 2018/19. In regional areas, current smoking prevalence decreased by 8.3 percentage points (2.5,14.1), down to 46.4% (42.5,50.2) in 2018/19. In remote settings, current smoking prevalence increased by 5.0 percentage points (0.4,9.5), up to 59.3% (56.1,62.4) in 2018/19. The absolute number of current smokers increased in all settings between 1994 and 2018/19, due to population growth. In 2018/19, the majority of current smokers lived in regional areas (96,000); relatively fewer smokers live in major cities (59,000) or remote and remote settings (56,000).

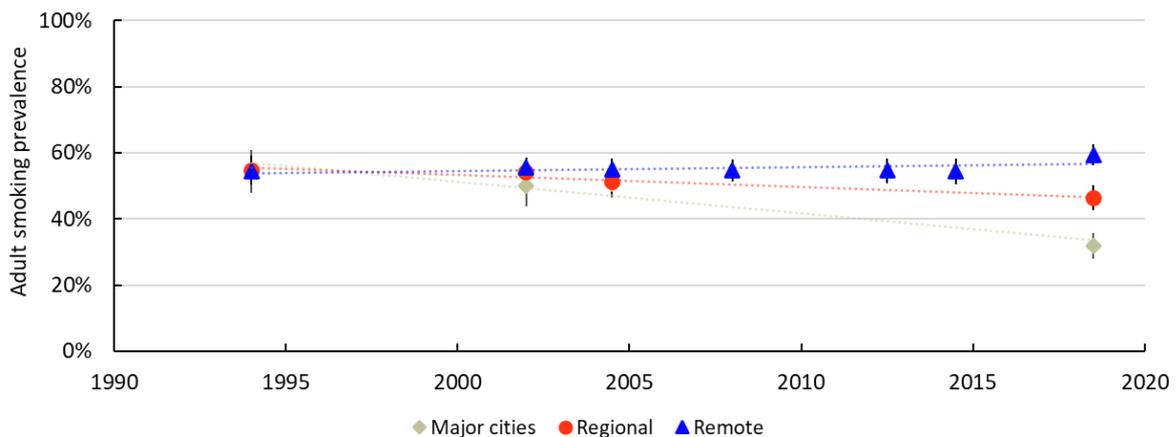
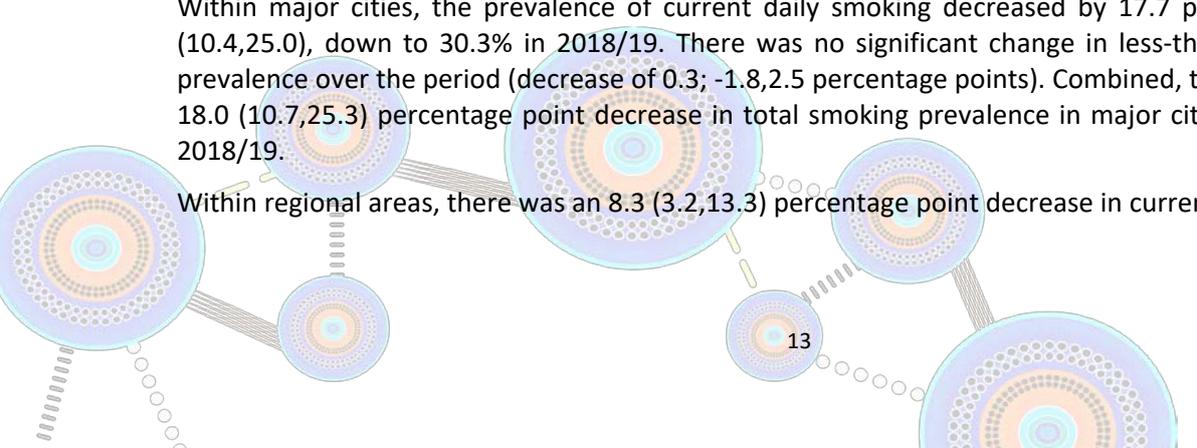


Figure 4. Aboriginal and Torres Strait Islander current (daily and less-than-daily combined) adult smoking prevalence by remoteness, 1994-2018/19

The prevalence of current daily smoking in 2002 was not significantly different between major cities (48.0%; 41.9,54.1), regional areas (51.9%; 48.9,54.9), and remote areas (52.5%; 49.5,55.5) (Table 5). The prevalence of current less-than-daily smoking in 2002 was also similar across major cities (1.9%; 0.0,3.9), regional areas (2.0%; 1.4,2.7), and remote areas (2.9%; 2.0,3.9). However, prevalence trends diverged.

Within major cities, the prevalence of current daily smoking decreased by 17.7 percentage points (10.4,25.0), down to 30.3% in 2018/19. There was no significant change in less-than-daily smoking prevalence over the period (decrease of 0.3; -1.8,2.5 percentage points). Combined, this resulted in an 18.0 (10.7,25.3) percentage point decrease in total smoking prevalence in major cities from 2002 to 2018/19.

Within regional areas, there was an 8.3 (3.2,13.3) percentage point decrease in current daily smoking



prevalence, down to 43.7% in 2018/19. There was no significant change in less-than-daily smoking prevalence over the period (increase of 0.7; -0.9,2.2 percentage points). Combined, this resulted in a 7.6 (2.8,12.4) percentage point decrease in total smoking prevalence in regional areas from 2002 to 2018/19.

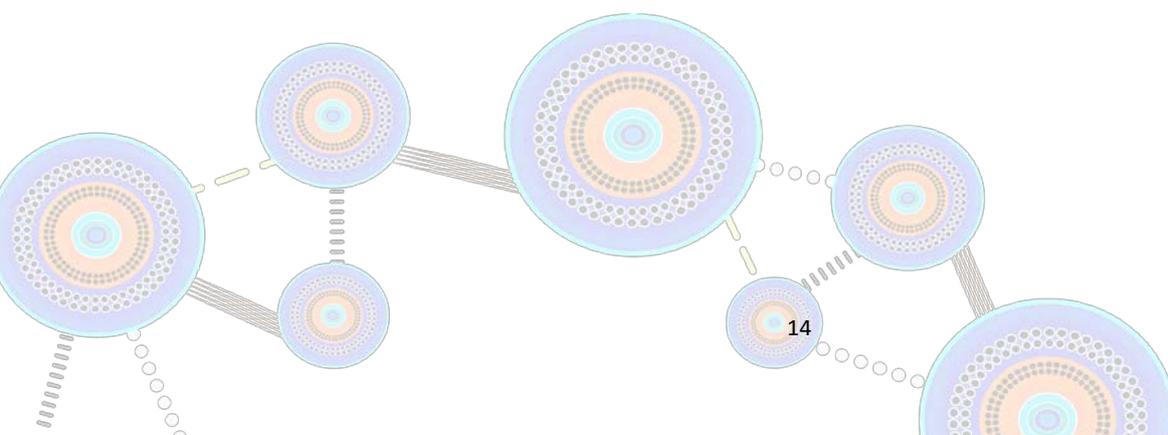
Within remote areas, there was no significant change in current daily smoking prevalence from 2002 to 2018/19 (absolute decrease of 0.4%; -4.5,5.3), with current daily smoking prevalence at 52.1% in 2018/19. However, there was a significant increase in the prevalence of less-than-daily smoking over this period (from 2.9% to 7.1%; increase of 4.2; 1.7,6.6 percentage points). This resulted in a non-significant 3.8 (-0.6,8.2) percentage point increase in total current smoking prevalence in remote areas from 2002 to 2018/19. In 2018/19, the respective prevalences of current daily smoking, current less-than-daily smoking, and total current smoking were all significantly higher in remote areas compared to major cities or regional areas. For example, current daily smoking prevalence was 30.3% (26.2,34.3) in major cities, 43.7% (39.6,47.7) in regional areas, and 52.1% (48.3,56.0) in remote areas.

Trends in adult smoking prevalence, by sex and remoteness

From 1994 to 2018/19, decreases in current smoking prevalence within major cities were similar – and substantial – for males (23.7; 11.7,35.7 percentage point decrease, from 55.3% to 31.6%) and females (21.5; 13.2,29.9 percentage point decrease, from 53.6% to 32.1%) (Figure 5; Table 3). In 2018/19, there was a similar number of male (28,000) and female (31,000) current smokers in major cities.

From 1994 to 2018/19, prevalence decreases were moderate within regional areas for both males and females, with a non-significant decrease of 6.6 percentage points (-1.4,14.6) for males, from 56.0% to 49.4%, and a significant decrease of 9.9 percentage points (3.3,16.5) for females, from 53.5% to 43.6%. In 2018/19, there were 49,000 male current smokers in regional areas, and 47,000 female current smokers.

Within remote settings, distinct trends were observed for males compared to females. In 1994, current smoking prevalence in remote areas was significantly higher among males (64.4%; 60.8,68.0) than among females (44.9%; 40.6,49.1). Between 1994 and 2018/19, there was a non-significant change in current smoking prevalence among males living in remote areas (increase of 1.2; -4.1,6.5 percentage points), with the prevalence at 65.6% in 2018/19. In contrast, there was a significant 8.6 (2.4,14.7) percentage point increase in current smoking prevalence among females living in remote areas, increasing up to 53.4% in 2018/19. Despite the observed increase among females, current smoking prevalence in 2018/19 remained significantly higher in males compared to females living in remote areas, and the absolute number of current smokers was larger for males (30,000) than females (26,000).



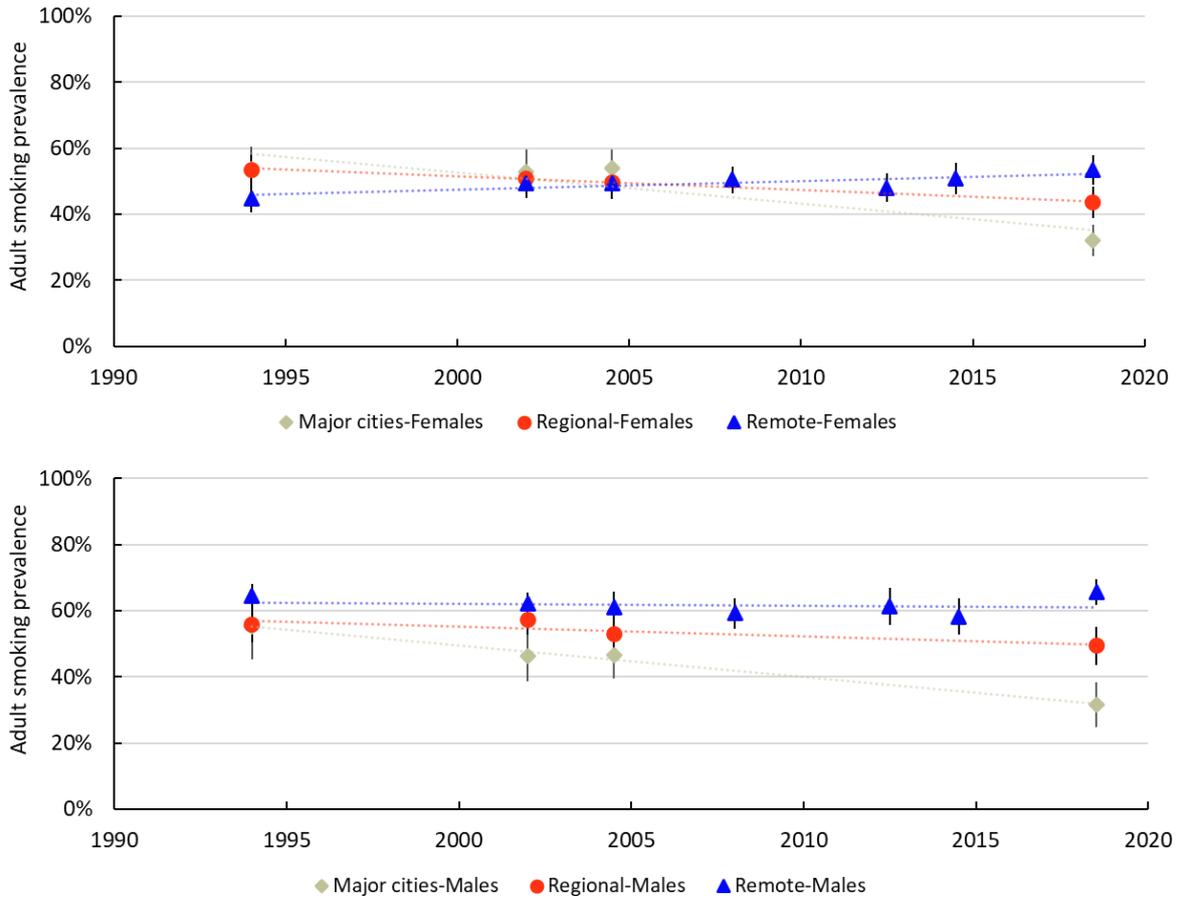


Figure 5. Aboriginal and Torres Strait Islander current (daily and less-than-daily combined) adult smoking prevalence by remoteness and sex, 1994-2018/19

Similar patterns emerge when examining sex-by-remoteness trends in current daily smoking prevalence from 2002 to 2018/19 (Table 5). Current daily smoking prevalence decreased significantly and substantially for both males and females living in major cities, and there was a more moderate prevalence decrease for males and females living in regional areas. There was no significant change in the prevalence of less-than-daily smoking from 2002 to 2018/19 for any of these groups. Within remote areas, there was no significant change in current daily smoking prevalence for males or for females, but there was a significant increase in less-than-daily smoking prevalence for both groups (increase of 4.9; 0.9,8.9 percentage points for males and 3.5; 0.5,6.6 percentage points for females). This resulted in a non-significant increase in total current smoking prevalence for males and females in remote areas from 2002 to 2018/19.

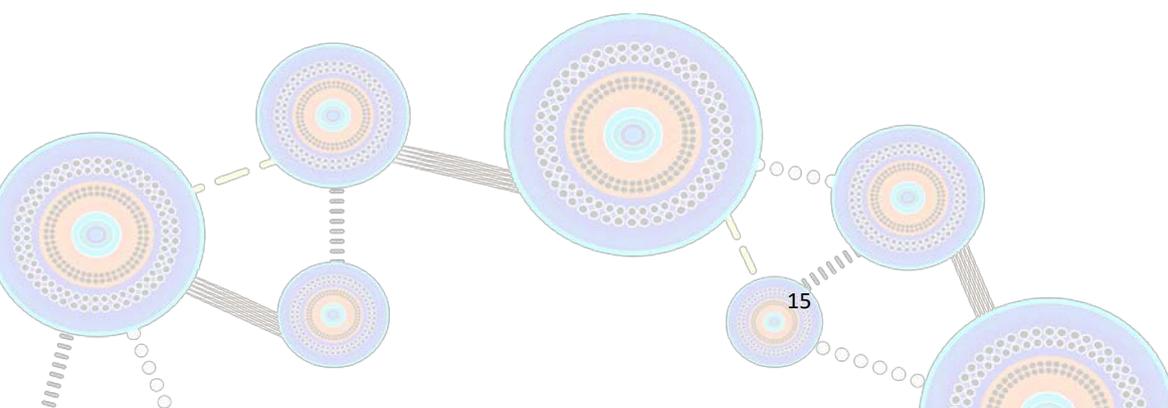


Table 3. Aboriginal and Torres Strait Islander current (any amount) smoking prevalence, absolute prevalence change (percentage point change), and absolute number of smokers, 1994-2018/19, for all adults and by age group, sex, and remoteness

	Survey period														Percentage point change (95%CI)
	1994		2002		2004/05		2008		2012/13		2014/15		2018/19		
	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	
TOTAL ADULT POPULATION	54.5 (51.6,57.3)	104/191	53.1 (50.6,55.6)	134/251	52.1 (49.9, 54.3)	135/258	49.8 (47.8, 51.9)	145/290	45.8 (43.6, 48.0)	168/366	44.5 (42.2, 47.0)	178/400	43.3 (41.1,45.6)	211/486	-11.1 (-14.7,-7.5)*
Age group															
18-24 years	55.4 (50.2,60.5)	26/47	57.2 (51.5,63.0)	29/52	52.6 (47.8,57.4)	30/57	53.0 (48.3,57.6)	36/68	44.7 (40.3, 49.0)	38/85	41.3 (35.4,47.2)	39/94	39.5 (34.3,44.7)	42/106	-15.8 (-23.1, -8.6)*
25-34 years	62.7 (57.9,67.4)	37/58	57.2 (53.5,61.0)	41/71	56.0 (51.5,60.5)	39/70	55.8 (52.2,59.4)	39/70	54.6 (50.4, 58.7)	47/87	49.8 (45.3,54.2)	48/96	47.3 (42.3,52.3)	56/118	-15.3 (-22.2, -8.5)*
35-44 years	56.4 (51.6,61.3)	23/40	57.2 (53.1,61.3)	33/58	59.0 (55.0,62.9)	35/59	53.1 (48.9,57.3)	34/64	48.9 (44.6, 53.1)	38/78	49.4 (44.7,54.1)	37/75	49.8 (44.5,55.1)	42/84	-6.7 (-13.8, 0.4)
45-54 years	49.0 (43.3,54.7)	11/23	49.0 (43.7,54.3)	19/38	51.9 (47.0,56.8)	21/40	48.0 (43.2,52.7)	22/47	48.5 (43.1, 53.9)	29/60	48.4 (43.5,53.3)	32/66	44.9 (39.3,50.5)	37/82	-4.1 (-12.0, 3.8)
55-64 years	36.5 (24.6,48.4)	5/14	41.0 (34.2,47.8)	8/19	34.9 (28.4,41.4)	7/21	39.4 (33.8,44.9)	10/27	31.8 (26.8, 36.9)	11/35	36.8 (31.5,42.2)	16/42	45.9 (39.8,52.0)	26/58	9.4 (-3.9, 22.7)
≥65 years	25.2 (14.5,36.0)	2/7	26.2 (18.6,33.8)	3/13	24.4 (18.0,30.8)	3/12	20.4 (14.9,25.9)	3/16	19.4 (14.1, 24.7)	4/22	25.1 (19.9,30.4)	6/26	21.1 (16.1,26.1)	8/40	-4.1 (-15.8, 7.5)
Sex															
Male	58.4 (54.7,62.1)	53/90	55.4 (52.3,58.5)	66/119	53.3 (50.1,56.6)	64/120	52.6 (49.5,55.7)	72/138	47.4 (44.5, 50.4)	85/179	47.2 (43.7,50.7)	90/191	45.7 (42.0,49.4)	107/233	-12.7 (-17.9,-7.5)*
Female	50.9 (48.0,53.9)	51/100	51.1 (48.2,54.0)	68/132	51.0 (48.1,53.9)	70/138	47.4 (44.7,50.0)	73/153	44.3 (41.7, 46.8)	83/187	42.1 (39.3,44.9)	88/209	41.1 (38.3,44.0)	104/253	-9.8 (-13.9,-5.7)*
Remoteness															
Major cities	54.4 (47.8,61.0)	31/58	49.9 (43.8,56.0)	38/76	50.7 (46.3,55.1)	40/79	--	--	--	--	--	--	31.8 (27.8,35.9)	59/185	-22.5 (-30.2,-14.8)*
Inner and outer regional	54.7 (50.3,59.1)	41/75	54.0 (51.0,56.9)	57/106	51.3 (47.7,54.9)	55/107	--	--	--	--	--	--	46.4 (42.5,50.2)	96/207	-8.3 (-14.1,-2.5)*
Remote and very remote	54.3 (50.9,57.7)	32/58	55.5 (52.3,58.6)	38/69	54.8 (51.4,58.3)	40/73	54.6 (51.2,58.0)	41/75	54.5 (50.7, 58.3)	45/83	54.3 (50.3,58.4)	48/90	59.3 (56.1,62.4)	56/94	5.0 (0.4,9.5)*
Sex and remoteness															
Males, major cities	55.3 (45.2,65.5)	14/26	46.3 (38.6,53.9)	16/34	46.7 (39.5,53.9)	16/35	--	--	--	--	--	--	31.6 (24.9,38.4)	28/89	-23.7 (-35.7,-11.7)*
Females, major cities	53.6 (46.7,60.4)	17/32	52.9 (46.1,59.6)	22/42	53.8 (48.2,59.5)	24/44	--	--	--	--	--	--	32.1 (27.2,37.0)	31/96	-21.5 (-29.9,-13.2)*
Males, inner and outer regional	56.0 (50.4,61.5)	20/36	57.1 (52.9,61.4)	29/52	52.8 (48.0,57.7)	27/52	--	--	--	--	--	--	49.4 (43.5,55.2)	49/99	-6.6 (-14.6,1.4)
Females, inner and outer regional	53.5 (48.8,58.2)	21/39	50.9 (47.2,54.7)	28/55	49.8 (44.8,54.8)	27/55	--	--	--	--	--	--	43.6 (38.9,48.3)	47/108	-9.9 (-16.5,-3.3)*
Males, remote and very remote	64.4 (60.9,68.0)	18/28	62.2 (58.9,65.5)	21/33	61.0 (56.4,65.7)	21/34	59.2 (54.6,63.9)	21/36	61.3 (55.7, 66.8)	25/41	58.3 (52.7,63.8)	24/42	65.6 (61.7,69.6)	30/45	1.2 (-4.1,6.5)
Females, remote and very remote	44.9 (40.6,49.1)	13/30	49.2 (44.8,53.6)	18/36	49.4 (44.7,54.2)	19/39	50.4 (46.2,54.5)	20/39	48.0 (43.7, 52.4)	20/42	50.8 (46.0,55.7)	24/47	53.4 (48.9,57.9)	26/49	8.6 (2.4,14.7)*

-- indicates that data were not available, due to different variable categorisations used across survey years. n/N reflects the weighted figures, in thousands, with n representing the total number nationally with the outcome of interest, and N representing the in-scope population denominator. *Indicates significant prevalence change from 1994 to 2018/19.

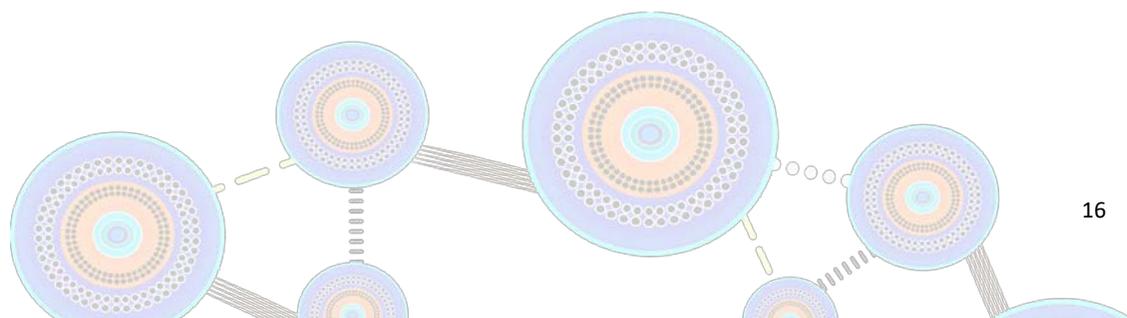


Table 4. Aboriginal and Torres Strait Islander current daily and less-than-daily smoking prevalence, prevalence change (percentage point change), and absolute number of smokers, 2002-2018/19, for all adults and by age group

	Survey period												Percentage point change (95%CI)
	2002		2004/05		2008		2012/13		2014/15		2018/19		
	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	
TOTAL ADULT POPULATION													
Current smoker	53.1 (50.6,55.6)	134/251	52.1 (49.9, 54.3)	135/258	49.8 (47.8, 51.9)	145/290	45.8 (43.6, 48.0)	168/366	44.5 (42.2, 47.0)	178/400	43.3 (41.1,45.6)	211/486	-9.8 (-13.2,-6.4)*
Daily smoker	50.9 (48.4,53.4)	128/251	50.0 (47.8, 52.2)	129/258	47.7 (45.7, 49.7)	139/290	43.8 (41.6, 45.9)	160/366	41.4 (39.1, 43.6)	165/400	40.2 (37.9,42.5)	196/486	-10.7 (-14.1,-7.3)*
Less-than-daily smoker	2.3 (1.6,3.0)	6/251	2.1 (1.4, 2.7)	5/258	2.2 (1.7, 2.9)	6/290	2.1 (1.5, 2.6)	8/366	3.1 (2.4, 3.8)	13/400	3.1 (2.3,4.0)	15/486	0.9 (-0.2,2.0)
BY AGE GROUP													
18-24 years													
Current smoker	57.2 (51.5,63.0)	29/52	52.6 (47.8,57.4)	30/57	53.0 (48.3,57.6)	36/68	44.7 (40.3, 49.0)	38/85	41.3 (35.4,47.2)	39/94	39.5 (34.3,44.7)	42/106	-17.7 (-25.5, -10.0)*
Daily smoker	52.9 (46.9,58.9)	27/52	50.5 (45.7,55.3)	29/57	49.7 (45.2,54.2)	34/68	42.4 (38.0, 46.8)	36/85	37.3 (31.8,42.9)	35/94	35.6 (30.3,40.8)	38/106	-17.3 (-26.0,-8.6)*
Less-than-daily smoker	4.3 (1.5,7.2)	2/52	2.1 (0.9,3.2)	1/57	3.3 (1.7,4.8)	2/68	2.3 (1.2, 3.4)	2/85	3.9 (2.0,5.8)	4/94	3.9 (1.6,6.3)	4/106	-0.4 (-4.1,3.3)
25-34 years													
Current smoker	57.2 (53.5,61.0)	41/71	56.0 (51.5,60.5)	39/70	55.8 (52.2,59.4)	39/70	54.6 (50.4, 58.7)	47/87	49.8 (45.3,54.2)	48/96	47.3 (42.3,52.3)	56/118	-9.9 (-16.1, -3.7)*
Daily smoker	55.2 (51.4,59.0)	39/71	54.6 (50.0,59.1)	38/70	52.9 (49.4,56.4)	37/70	51.6 (47.6, 55.7)	45/87	45.5 (41.1,49.9)	44/96	44.0 (38.8,49.1)	52/118	-11.3 (-17.6,-4.9)*
Less-than-daily smoker	2.0 (1.2,2.8)	1/71	1.4 (0.7,2.1)	1/70	2.9 (1.8,4.1)	2/70	2.9 (1.6, 4.2)	3/87	4.2 (2.5,6.0)	4/96	3.4 (1.9,4.9)	4/118	1.4 (-0.3,3.0)
35-44 years													
Current smoker	57.2 (53.1,61.3)	33/58	59.0 (55.0,62.9)	35/59	53.1 (48.9,57.3)	34/64	48.9 (44.6, 53.1)	38/78	49.4 (44.7,54.1)	37/76	49.8 (44.5,55.1)	42/84	-7.4 (-14.1, -0.8)*
Daily smoker	55.5 (51.4,59.5)	32/58	55.1 (51.1,59.1)	33/59	51.1 (46.8,55.4)	33/64	46.8 (42.6, 51.0)	36/78	46.4 (41.7,51.1)	35/76	46.6 (41.2,52.0)	39/84	-8.9 (-15.6,-2.1)*
Less-than-daily smoker	1.7 (0.9,2.5)	1/58	3.8 (1.4,6.2)	2/59	2.0 (1.2,2.8)	1/64	2.1 (0.9, 3.2)	2/78	3.0 (1.7,4.3)	2/76	3.2 (1.5,4.8)	3/84	1.4 (-0.4,3.3)
45-54 years													
Current smoker	49.0 (43.7,54.3)	19/38	51.9 (47.0,56.8)	21/40	48.0 (43.2,52.7)	22/47	48.5 (43.1, 53.9)	29/60	48.4 (43.5,53.3)	32/66	44.9 (39.3,50.5)	37/82	-4.1 (-11.8, 3.6)
Daily smoker	47.9 (42.6,53.2)	18/38	50.5 (45.6,55.3)	20/40	46.9 (42.2,51.6)	22/47	46.9 (41.6, 52.2)	28/60	45.9 (41.3,50.5)	30/66	42.1 (36.5,47.8)	34/82	-5.8 (-13.5,2.0)
Less-than-daily smoker	1.1 (0.5,1.7)	<1/38	1.4 (0.4,2.5)	<1/40	1.0 (0.4,1.7)	<1/47	1.6 (0.3, 2.9)	1/60	2.5 (1.4,3.7)	2/66	2.8 (1.3,4.2)	34/82	1.7 (0.1,3.2)
55-64 years													
Current smoker	41.0 (34.2,47.8)	8/19	34.9 (28.4,41.4)	7/21	39.4 (33.8,44.9)	10/27	31.8 (26.8, 36.9)	11/35	36.8 (31.5,42.2)	16/42	45.9 (39.8,52.0)	26/58	4.9 (-4.2, 14.0)
Daily smoker	38.6 (31.6,45.7)	7/19	--	--	--	--	--	--	35.4 (29.9,40.9)	--	42.8 (36.7,49.0)	25/58	4.2 (-5.2,13.5)
Less-than-daily smoker	2.3 (0.2,4.5)	<1/19	--	--	--	--	--	--	1.4 (0.5,2.4)	--	3.1 (0.5,5.8)	2/58	0.8 (-2.6,4.2)
>65 years													
Current smoker	26.2 (18.6,33.8)	3/13	24.4 (18.0,30.8)	3/12	20.4 (14.9,25.9)	3/16	19.4 (14.1, 24.7)	4/22	25.1 (19.9,30.4)	6/26	21.1 (16.1,26.1)	8/40	-5.1 (-14.1, 3.9)
Daily smoker	25.3 (17.9,32.8)	3/13	--	--	--	--	--	--	--	--	20.1 (15.1,25.1)	8/40	-5.3 (-14.2,3.6)
Less-than-daily smoker	8.8 (0.0,1.9)	<1/13	--	--	--	--	--	--	--	--	1.0 (0.1,2.0)	0/40	0.2 (-1.2,1.6)

-- indicates that data were not available, due to different variable categorisations used across survey years, or due to small numbers in one or more categories in the unweighted data. n/N reflects the weighted figures, in thousands, with n representing the total number nationally with the outcome of interest, and N representing the in-scope population denominator. * Represents a statistically significant prevalence change.

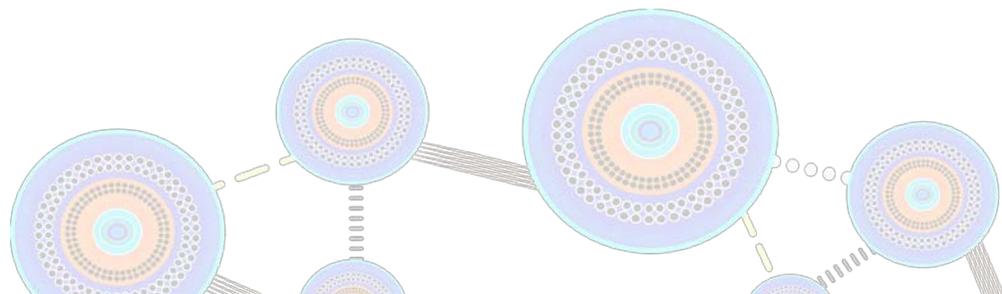
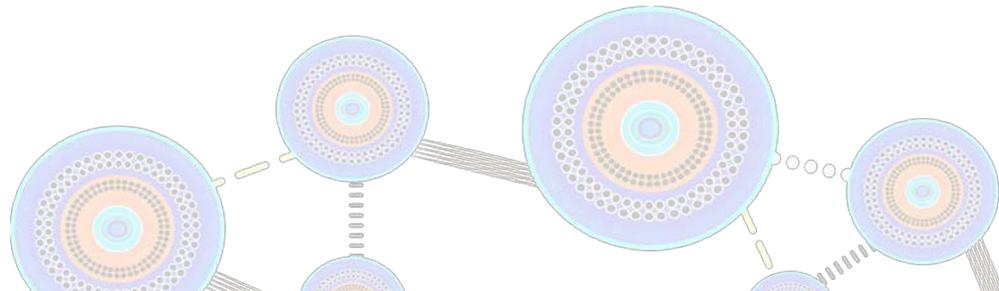


Table 5. Aboriginal and Torres Strait Islander current daily and less-than-daily smoking prevalence, prevalence change (percentage point change), and absolute number of smokers, 2002-2018/19, by sex and remoteness

	Survey period												Percentage point change (95%CI)
	2002		2004/05		2008		2012/13		2014/15		2018/19		
	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	
BY SEX													
Male													
Current smoker	55.4 (52.3,58.5)	66/119	53.3 (50.1,56.6)	64/120	52.6 (49.5,55.7)	72/138	47.4 (44.5, 50.4)	85/179	47.2 (43.7,50.7)	90/191	45.7 (42.0,49.4)	107/233	-9.7 (-14.5,-4.9)*
Daily smoker	53.2 (50.0,56.3)	63/119	51.3 (48.0,54.6)	61/120	49.9 (46.9,52.9)	69/138	45.4 (42.2, 48.3)	81/179	43.9 (40.4,47.4)	84/191	41.9 (38.1,45.7)	98/233	-11.3 (-16.2,-6.4)*
Less-than-daily smoker	2.2 (1.4,3.1)	3/119	2.1 (1.3,2.8)	2/120	2.7 (1.9,3.5)	4/138	2.1 (1.2, 2.9)	4/179	3.3 (2.3,4.4)	6/191	3.8 (2.3,5.4)	9/233	1.6 (-0.2,3.4)
Female													
Current smoker	51.1 (48.2,54.0)	68/132	51.0 (48.1,53.9)	70/138	47.4 (44.7,50.0)	73/153	44.3 (41.7, 46.8)	83/187	42.1 (39.3,44.9)	88/209	41.1 (38.3,44.0)	104/253	-10.0 (-14.0,-5.9)*
Daily smoker	48.8 (45.9,51.7)	65/132	48.9 (46.1,51.8)	67/138	45.7 (43.1,48.2)	70/153	42.2 (39.6, 45.0)	79/187	39.1 (36.4,41.9)	82/209	38.6 (35.8,41.4)	98/253	-10.2 (-14.2,-6.2)*
Less-than-daily smoker	2.3 (1.5,3.0)	3/132	2.0 (1.0,3.1)	3/138	1.7 (1.1,2.3)	3/153	2.1 (1.5, 2.7)	4/187	3.0 (2.1,3.9)	6/209	2.5 (1.5,3.4)	6/253	0.2 (-1.0,1.4)
BY REMOTENESS													
Major cities													
Current smoker	49.9 (43.8,56.0)	38/76	50.7 (46.3,55.1)	40/79	--	--	--	--	--	--	31.8 (27.8,35.9)	59/185	-18.0 (-25.3,-10.7)*
Daily smoker	48.0 (41.9,54.1)	36/76	49.0 (44.6,53.4)	39/79	--	--	--	--	--	--	30.3 (26.2,34.3)	56/185	-17.7 (-25.0,-10.4)*
Less-than-daily smoker	1.9 (0.0,3.9)	1/76	1.7 (0.1,3.3)	1/79	--	--	--	--	--	--	1.6 (0.7,2.5)	3/185	-0.3 (-2.5,1.8)
Inner and outer regional													
Current smoker	54.0 (51.0,56.9)	57/106	51.3 (47.7,54.9)	55/107	--	--	--	--	--	--	46.4 (42.5,50.2)	96/207	-7.6 (-12.4,-2.8)*
Daily smoker	51.9 (48.9,54.9)	55/106	50.0 (46.0, 53.1)	53/107	--	--	--	--	--	--	43.7 (39.6,47.7)	90/207	-8.3 (-13.3,-3.2)*
Less-than-daily smoker	2.0 (1.4,2.7)	2/106	1.7 (1.0, 2.5)	2/107	--	--	--	--	--	--	2.7 (1.3,4.2)	6/207	0.7 (-0.9,2.2)
Remote and very remote													
Current smoker	55.5 (52.3,58.6)	38/69	54.8 (51.4,58.3)	40/73	54.6 (51.2,58.0)	41/75	54.5 (50.1, 58.3)	45/83	54.3 (50.3,58.4)	48/89	59.3 (56.1,62.4)	56/94	3.8 (-0.6,8.2)
Daily smoker	52.5 (49.5,55.5)	36/69	51.9 (48.6, 55.3)	38/73	51.5 (48.1,54.9)	39/75	51.8 (47.7, 56.0)	42/83	49.3 (45.3,53.2)	44/89	52.1 (48.3,56.0)	49/94	-0.4 (-5.3,4.5)
Less-than-daily smoker	2.9 (2.0,3.9)	2/69	2.9 (1.8, 4.1)	2/73	3.1 (2.1,4.2)	2/75	2.7 (1.3, 4.0)	2/83	5.1 (3.6,6.5)	5/89	7.1 (4.8,9.4)	7/94	4.2 (1.7,6.6)*
BY SEX AND REMOTENESS													
Males, major cities													
Current smoker	46.3 (38.6,53.9)	16/34	46.7 (39.5,53.9)	16/35	--	--	--	--	--	--	31.6 (24.9,38.4)	28/89	-14.6 (-24.8,-4.5)*
Daily smoker	44.3 (36.8,51.8)	15/34	45.6 (38.4,52.8)	16/35	--	--	--	--	--	--	29.7 (23.1,36.2)	26/89	-14.6 (-24.5,-4.8)*
Less-than-daily smoker	2.0 (0.0,4.4)	1/34	1.1 (0.1,2.0)	<1/35	--	--	--	--	--	--	2.0 (0.5,3.5)	2/89	0.0 (-2.8,2.8)
Females, major cities													
Current smoker	52.9 (46.1,59.6)	22/42	53.8 (48.2,59.5)	24/44	--	--	--	--	--	--	32.1 (27.2,37.0)	31/96	-20.8 (-29.1,-12.5)*
Daily smoker	51.0 (44.2,57.7)	21/42	51.7 (45.8,57.5)	23/44	--	--	--	--	--	--	30.8 (25.9,35.7)	30/96	-20.2 (-28.5,-11.9)*
Less-than-daily smoker	1.9 (0.0,3.7)	1/42	2.2 (0.0,5.0)	1/44	--	--	--	--	--	--	1.2 (0.2,2.3)	1/96	-0.6 (-2.7,1.5)
Males, inner and outer regional													
Current smoker	57.1 (52.9,61.4)	29/52	52.8 (48.0,57.7)	27/52	--	--	--	--	--	--	49.4 (43.5,55.2)	49/99	-7.8 (-15.0,-0.6)*
Daily smoker	55.5 (51.2,59.7)	29/52	50.8 (45.7,55.9)	26/52	--	--	--	--	--	--	45.9 (39.7,52.0)	46/99	-9.6 (-17.0,-2.2)*
Less-than-daily smoker	1.7 (0.8,2.5)	1/52	2.0 (0.8,3.2)	1/52	--	--	--	--	--	--	3.5 (0.8,6.1)	3/99	1.8 (-0.9,4.6)
Females, inner and outer regional													
Current smoker	50.9 (47.2,54.7)	28/55	49.8 (44.8,54.8)	27/55	--	--	--	--	--	--	43.6 (38.9,48.3)	47/108	-7.3 (-13.3,-1.4)*
Daily smoker	48.5 (44.6,52.5)	26/55	48.4 (43.7,53.1)	27/55	--	--	--	--	--	--	41.6 (36.9,46.3)	45/108	-6.9 (-13.1,-0.8)*
Less-than-daily smoker	2.4 (1.3,3.5)	1/55	1.4 (0.5,2.3)	<1/55	--	--	--	--	--	--	2.0 (0.5,3.5)	2/108	-0.4 (-2.2,1.4)
Males, remote and very remote													
Current smoker	62.2 (58.9,65.5)	21/33	61.0 (56.4,65.7)	21/34	59.2 (54.6,63.9)	21/36	61.3 (55.7, 66.8)	25/41	58.3 (52.7,63.8)	24/42	65.6 (61.7,69.6)	30/45	3.5 (-1.7,8.6)
Daily smoker	58.8 (55.4,62.1)	20/33	57.9 (53.3,62.6)	20/34	55.3 (50.8,59.8)	20/36	58.2 (52.3, 64.1)	24/41	53.4 (47.9,58.9)	22/42	57.3 (51.7,62.9)	26/45	-1.4 (-7.9,5.0)
Less-than-daily smoker	3.4 (2.2,4.6)	1/33	3.1 (1.6,4.6)	1/34	3.9 (2.3,5.5)	1/36	3.0 (0.8, 5.2)	1/41	4.8 (3.0,6.7)	2/42	8.3 (4.5,12.1)	4/45	4.9 (0.9,8.9)*
Females, remote and very remote													
Current smoker	49.2 (44.8,53.6)	18/36	49.4 (44.7,54.2)	19/39	50.4 (46.2,54.5)	20/39	48.0 (43.7, 52.4)	20/42	50.8 (46.0,55.7)	24/47	53.4 (48.9,57.9)	26/49	4.2 (-2.0,10.5)
Daily smoker	46.7 (42.5,50.9)	17/36	46.7 (42.0,51.4)	18/39	48.0 (43.8,52.2)	19/39	45.7 (41.4, 50.0)	19/42	45.5 (40.6,50.5)	21/47	47.4 (43.1,51.7)	23/49	0.7 (-5.3,6.7)
Less-than-daily smoker	2.5 (1.6,3.4)	1/36	2.8 (1.5,4.0)	1/39	2.4 (1.2,3.6)	1/39	2.3 (1.1, 3.5)	1/42	5.3 (3.5,7.1)	6/47	6.0 (3.2,8.8)	3/49	3.5 (0.5,6.6)*

-- indicates that data were not available, due to different variable categorisations used across survey years, or due to small numbers in one or more categories in the unweighted data. n/N reflects the weighted figures, in thousands, with n representing the total number nationally with the outcome of interest, and N representing the in-scope population denominator. * Represents a statistically significant prevalence change.



Results: adult e-cigarette use

Adult e-cigarette use in 2018/19

Less than one in ten (8.1%; 6.7,9.4) Aboriginal and Torres Strait Islander adults have ever used e-cigarettes; this corresponds to 39,000 adults (Table 6; Figure 6). Current use is substantially lower than lifetime use, meaning that most people who have ever tried e-cigarettes are not currently using e-cigarettes daily or weekly. Around one in one hundred (1.3%; 0.8,1.9) adults are current users, using e-cigarettes daily or weekly. This corresponds to 7,000 adults currently using e-cigarettes. Less than 3% (2.7%; 1.9,3.6) of Aboriginal and Torres Strait Islander adults had used an e-cigarette product containing nicotine within the year preceding the survey. This corresponds to 13,400 people.

Table 6. Aboriginal and Torres Strait Islander adult e-cigarette use, overall and by age group, sex, and remoteness, 2018/19

	Ever used e-cigarettes		Currently uses e-cigarettes		Used e-cigarette with nicotine in past year	
	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]	% (95%CI)	n/N ['000s]
Total population aged 18 years and over	8.1 (6.7,9.4)	39/486	1.3 (0.8,1.9)	7/486	2.7 (1.9,3.6)	13/486
Age group (years)						
18-24	13.6 (9.8,17.5)	14/106	2.0 (0.2,3.8)	2/106	5.1 (2.5,7.7)	5/106
25-44	8.6 (6.7,10.5)	17/202	1.6 (0.8,2.4)	3/202	2.7 (1.7,3.8)	5/202
≥45	4.2 (2.9,5.4)	7/179	0.6 (0.0,1.2)	1/179	1.4 (0.6,2.1)	2/179
Sex						
Male	9.7 (7.7,11.7)	23/233	1.9 (1.0,2.9)	5/233	3.4 (2.1,4.8)	8/233
Female	6.5 (4.8,8.2)	17/253	0.8 (0.3,1.4)	2/253	2.1 (1.2,3.0)	5/253
Remoteness						
Major cities	10.1 (7.8,12.5)	19/185	1.9 (0.8,2.9)	3/185	3.1 (1.9,4.3)	6/185
Inner and outer regional	8.7 (6.3,11.1)	18/207	--	--	3.4 (1.8,5.1)	7/207
Remote and very remote	2.6 (1.5,3.6)	2/94	--	--	0.4 (0.0,0.9)	<1/94

-- indicates that data were not available, due to different variable categorisations used across survey years, or due to small numbers in one or more categories in the unweighted data.

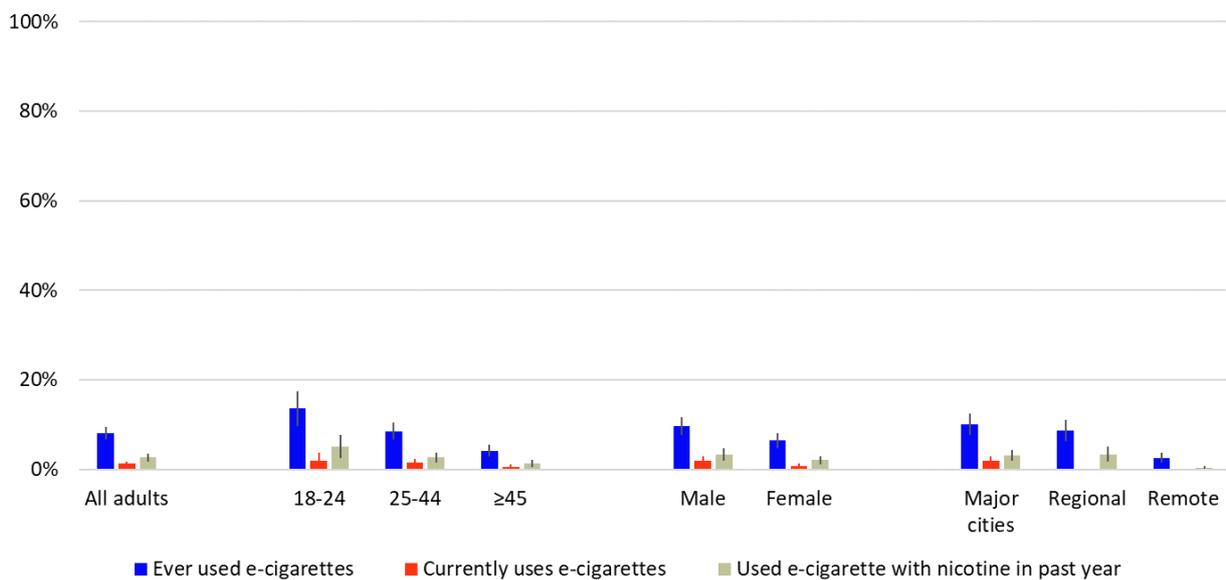
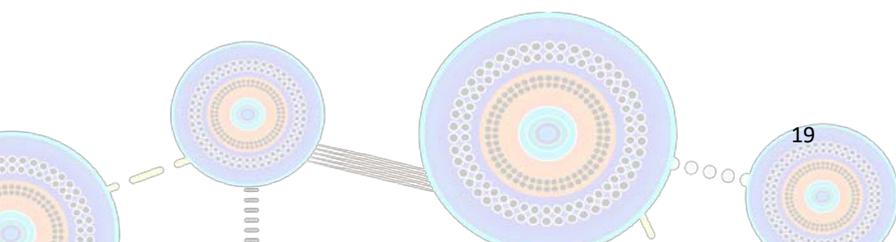


Figure 6. Aboriginal and Torres Strait Islander adult e-cigarette use, overall and by age group, sex, and remoteness, 2018/19



Adult e-cigarette use by age group

Ever use of e-cigarettes was significantly more common among those aged 18-24 years (13.6%; 9.8,17.5) and aged 25-44 years (8.6%; 6.7,10.5), compared to those aged 45 years and over (4.2%; 2.9,5.4) (Table 6; Figure 6). There are 14,000 adults aged 18-24 years who have ever used e-cigarettes, 17,000 aged 25-44 years, and 7,000 aged ≥ 45 years.

There was a similar age pattern in current use of e-cigarettes, though differences were not statistically significant. Specifically, 2.0% (0.2,3.8) of adults aged 18-24 years and 1.6% (0.8,2.4) of those aged 25-44 years were current users of e-cigarettes, compared to 0.6% (0.0,1.2) of those aged 45 years and over. This corresponds to 2,100, 3,300, and 1,200 current e-cigarette users, respectively.

Use of e-cigarettes containing nicotine within the past year was more common among younger age groups. One in twenty (5.1%; 2.5,7.7) adults aged 18-24 years and 2.7% (1.7,3.8) of adults aged 25-44 years had used nicotine-containing e-cigarettes in the past year, compared to 1.4% (0.6,2.1) of adults aged ≥ 44 years. This corresponds to 5,400, 5,500, and 2,500 adults, respectively, using a nicotine-containing e-cigarette within the past year.

Adult e-cigarette use by sex

Ever use of e-cigarettes was 9.7% (7.7,11.7) among males and 6.5% (4.8,8.2) among females (Table 6; Figure 6); this difference is not statistically significant. This corresponds to 22,700 males and 16,500 females who had ever used e-cigarettes.

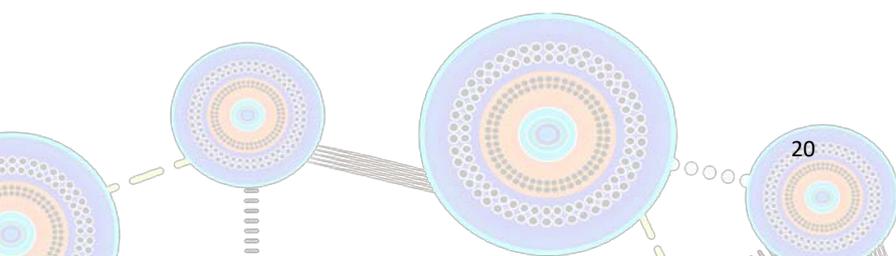
The prevalence of current use of e-cigarettes was lower among females (0.8%; 0.3,1.4) compared to males (1.9%; 1.0,2.9), but the difference was not statistically significant. This corresponds to 2,000 female and 5,000 male current e-cigarette users.

The pattern was similar for use of e-cigarettes containing nicotine. 2.1% (1.2,3.0) of females and 3.4% (2.1,4.8) of males had used nicotine-containing e-cigarettes in the past year. This corresponds to 5,000 females and 8,000 males.

Adult e-cigarette use by remoteness

Ever use of e-cigarettes was significantly more common among those living in major cities (10.1%; 7.8,12.5) and in regional areas (8.7%; 6.3,11.1), compared to those living in remote areas (2.6%; 1.5,3.6) (Table 6; Figure 6). The vast majority of e-cigarette users live in major cities (19,000 adults) and regional areas (18,000 adults), with a minority of e-cigarette users living in remote settings (2,400 adults).

Use of e-cigarettes containing nicotine within the past year was significantly more common in major cities and regional areas compared to remote areas, at 3.1% (1.9,4.3) of adults living in major cities, 3.4% in regional areas (1.8,5.1), and 0.4% (0.0,0.9) in remote areas. This corresponds to 6,000, 7,000, and <1,000 adults, respectively, using a nicotine-containing e-cigarette within the past year.



Cigarette and e-cigarette use by Aboriginal and Torres Strait Islander youth

Methods

Data sources

ABS nationally representative surveys

ABS surveys, as described above, are a source of nationally representative data on cigarette use and e-cigarette use for Aboriginal and Torres Strait Islander youth (aged 15-17 years). As outlined in Table 2, data on cigarette use is available in all surveys except the 2004/05 NATSIHS, and data on e-cigarette use is available in the 2018/19 survey.

In the 2018/19 survey, data on cigarette and e-cigarette use were collected through personal interview with the youth, if the parent or guardian consented. Where consent was granted for a personal interview, some youth answered in the presence of a parent or other adult, and other youth answered with no parent or other adult present. Where consent was not granted, a parent or other adult responded on behalf of the youth (referred to as the proxy). A similar approach was used in previous surveys.

The ABS have acknowledged that the presence of adults at interview might lead to under-reporting of youth smoking behaviours.²⁴ Before estimating prevalence of e-cigarette use, we aimed to quantify the potential magnitude of bias that might result from adult presence at interview. We examined data from the 2018/19 survey to explore this potential bias. For the 2018/19 survey, there is a variable that records the respondent and presence of adults for the questions about smoking. This variable is also provided in the data file for the 2012/13 NATSIHS. In the 2004/05 NATSIHS, there is a variable to indicate if the data were reported by a proxy or by youth self-report, but there is not information on whether or not an adult was present at interview. We were unable to identify a variable for proxy status or adult presence at interview for the 1994, 2002, or 2008 NATSISS surveys.

In the 2018/19 survey, it was only the minority of cases (7.4% of respondents aged 15-17 years) where the youth self-reported their smoking behaviours without any adults present (Table 7). A quarter (26.5%) of youth self-reported their smoking behaviours with an adult present. For the remaining 66.2% of youth, a proxy answered the smoking questions.

Table 7. Informant type and relationship with reported youth smoking behaviours, across surveys

2018/19 NATSIHS	% (n) in unweighted sample
Proxy	66.2 (350)
Youth self-report with adult present	26.5 (140)
Youth self-report with no adult present	7.4 (39)

We examined differences in youth smoking behaviours by informant type. First, we looked at the weighted proportion of ever smoking (current and past smoking combined) and ever e-cigarette use by informant. Due to small numbers for e-cigarette use, the informant type was categorised as a binary variable for these analyses (any adult versus no adult in the room). Analysis of ever smoking in relation to the categorical variable demonstrated that reported smoking prevalence was similar between the adult proxy and the youth self-report with parent in the room (data not shown), supporting combination of these two categories.

Next, we tested if any observed differences in reported smoking behaviours by adult presence were significant. We calculated the prevalence ratio (PR), and 95% CI, of each outcome by adult presence at interview, in the respondent sample (unweighted data). First, we modelled the unadjusted relationship. We then tested if any observed differences were attributable to differences in the characteristics of youth with versus without adult present. That is, we wanted to understand if the differences in reported smoking behaviours by adult presence could be explained by differences in the characteristics of youth who had, or did not have, an adult present at interview. To do this, we modelled the relationship between informant type and smoking behaviours adjusted for factors potentially linked to adult

presence and to smoking behaviours: age group, sex, and remoteness. The adjusted PR results presented are mutually adjusted for age group (15-16 or 17 years), sex (male or female), and remoteness (major city or regional and remote).

For youth with any adults present at interview, weighted reported current smoking prevalence was 11.2% (3.9,15.5), ex-smoking was 1.8% (0.2,3.3), and never smoking was 87.1% (82.5,92.7); see Table 8. In contrast, for youth with no adults present at interview, reported current smoking prevalence was 34.4% (6.0,62.8), ex-smoking was 31.3% (0.0,65.6), and never smoking was 34.3% (7.5,61.1). The difference in ever smoking prevalence (current and ex-smoking combined) by adult presence was significant; the adjusted prevalence ratio was 1.82 (1.31,2.52).

The weighted prevalence of reported youth ever e-cigarette use was 2.0% (0.0,5.1) for youth with any adults present at interview, compared to 29.5% (0.0,60.2) for those without any adults present (Table 8). After adjustment for potential demographic confounders, the prevalence ratio for e-cigarette use was significant, and substantial – the prevalence of e-cigarette use was over eight-fold for those without compared to with an adult present (aPR=8.6; 3.01,24.36).

Table 8. Informant type and relationship with reported youth smoking behaviours in the 2018/19 NATSIHS

	Ever smoked		Ever used e-cigarettes	
	Weighted % (95%CI)	aPR (95%CI)	Weighted % (95%CI)	aPR (95%CI)
Total sample	16.4 (11.2,21.5)	--	3.8 (0.0,7.5)	--
Informant type				
Proxy or youth self-report with adult present	12.9 (8.3,17.5)	1 (Ref)	2.0 (0.0,5.1)	1 (Ref)
Youth self-report with no adult present	65.7 (38.9,92.5)	1.82 (1.31,2.52)	29.5 (0.0,60.2)	8.56 (3.01,24.4)

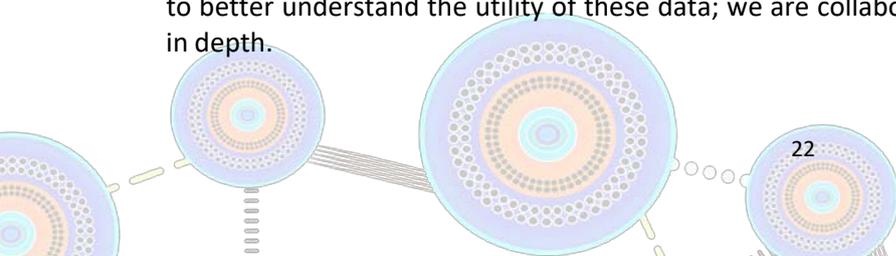
aPR = Prevalence Ratio adjusted for age, sex, and remoteness. Prevalence Ratios are calculated using unweighted data. Confidence intervals are wide due to small numbers in the youth self-report with no adult present category.

We note that there may be other factors (such as the youth’s level of independence, the smoking status of the adult present, or the relationship between the youth and the adult), not measured in this dataset, that may relate to both adult presence at interview and youth smoking behaviours and/or influence the extent to which a youth is comfortable disclosing their actual smoking behaviours. However, any additional factors are unlikely to account for the magnitude of difference observed.

These findings are consistent with substantial underreporting of youth cigarette – and particularly e-cigarette – use when collected by proxy or with adults present in the room. Given that smoking behaviours were collected via proxy or with adults present in the room for the vast majority of survey responses (i.e. 92.6% of 2018/19 NATSIHS youth respondents; 93.5% of the weighted sample), the magnitude of bias in prevalence estimates based on the full sample are likely to be very large. For example, if youth responses provided with no adult present are more accurate reflections of smoking behaviour, then at least 38.9% of youth may have ever used cigarettes (compared to 12.9% based on the full sample).

Given these potential limitations, prevalence estimates of cigarette and e-cigarette use from the ABS 2018/19 NATSIHS (or previous surveys) are not reported. Instead, we report prevalence estimates based on a scoping review of the published evidence on youth smoking prevalence and e-cigarette use from other national data sources, as described below.

We also do not present results based on internal comparisons of these data (i.e. demographic factors related to smoking behaviours in the sample), because of the potential magnitude of these biases. Observed changes in prevalence in ABS surveys could reflect true prevalence changes, but could also reflect changes in the proportion of youth who respond with an adult present, and/or variation in youth’s willingness to self-report smoking behaviours with an adult present. Further research can be conducted to better understand the utility of these data; we are collaborating with the ABS to explore these data in depth.



Australian Secondary Students' Alcohol and Drug Survey (ASSAD)

Data on youth smoking is collected every three years through the Australian Secondary Students' Alcohol and Drug Survey (ASSAD), starting in 1984.^{25,26} ASSAD is intended to survey a representative sample of all Australian students enrolled in school nationally.²⁵ The survey is conducted with youth aged 12 to 17 years.²⁵ Starting in 1996, participants were able to self-identify as Aboriginal and/or Torres Strait Islander.²⁵ It is not possible to examine data for Aboriginal and Torres Strait Islander youth before that year.

Between 1996 and 2017, Aboriginal and Torres Strait Islander students comprised 3-6% of the total ASSAD sample, with 673-1,317 Aboriginal and Torres Strait Islander youth participants in each survey.^{25,27}

The survey is administered on school premises by a research officer, and youth anonymously self-complete the survey on paper.²⁵ Teachers are present in the room for the majority of (but not all) surveys completed by youth. An assessment of the total Australian ASSAD sample did not find any evidence that reported tobacco use was lower when a teacher was present versus was not present.²⁶

There are several limitations to the scope of the survey, which should be kept in mind when interpreting Aboriginal and Torres Strait Islander youth prevalence estimates from these data. The sample is restricted to children who are attending schools; given that those not attending school are more likely to smoke, this survey will likely underestimate true smoking prevalence.²⁵ The sample does not adequately capture youth living in remote settings, or attending small schools (fewer than 100 students).

The same questions about smoking behaviours have been used across the years of ASSAD.^{25,26} The survey collects data on: if students have ever used a cigarette (even a puff), if they smoked in the four weeks preceding the survey, if they smoked in the past seven days, and the number of cigarettes smoked. Students are defined as committed smokers if they smoked on at least three of the days in the week preceding the survey. In addition, data on e-cigarette use was collected in the 2014 and 2017 survey. However, to date, no analysis of these data has been published. Therefore, we do not report on e-cigarette use data from this survey.

We have drawn Aboriginal and Torres Strait Islander youth cigarette smoking prevalence estimates from previous publications based on the ASSAD data.^{25,27} Prevalence estimates are presented by age group: 12-15 years (Years 7-10), and 16-17 years (Years 11 and 12). Confidence Intervals and/or standard errors were not provided in these publications; therefore, we cannot test for statistical differences between groups or over time.

The generalisability of these prevalence estimates to the total Aboriginal and Torres Strait Islander youth population needs to be further explored, particularly given the limitations to the sample scope, as described above, and considering potential reporting biases.

Other sources of data on youth smoking behaviours

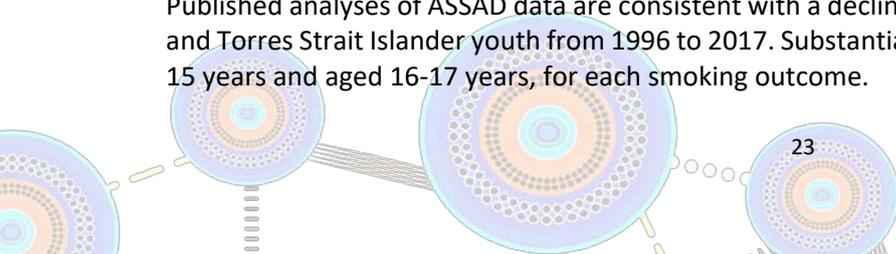
National data on youth smoking behaviours have also been collected from the National Drug Strategy Household Surveys (NDSHS) in multiple years. However, the number of Aboriginal and Torres Strait Islander participants in these surveys is very small, and therefore these data are not reported here.²⁸

National data on youth smoking behaviours have also been collected through the Longitudinal Study of Indigenous Children (LSIC; from around age 10 years onwards – including e-cigarette use), and Mayi Kuwayu: the National Study of Aboriginal and Torres Strait Islander wellbeing (Mayi Kuwayu Study; age 16-17 years). However, these data sources are not designed to generate nationally representative estimates and therefore are not suited to generating prevalence estimates beyond the study sample (unless weighting approaches are developed and applied). However, these longitudinal datasets are likely to be valuable in identifying factors protective against youth initiation of cigarette and/or e-cigarette use, and on the relations between cigarette and e-cigarette use over time.

Youth cigarette use

Prevalence of youth cigarette use

Published analyses of ASSAD data are consistent with a decline in smoking prevalence among Aboriginal and Torres Strait Islander youth from 1996 to 2017. Substantial declines are observed for youth aged 12-15 years and aged 16-17 years, for each smoking outcome.



In 2017, the majority of youth had never smoked at the time of survey (Table 9). Only 24% of youth aged 12-15 and 45% of 16-17 years had ever smoked. This is a 30 percentage point decrease from the figures in 1996, when 61% of those aged 12-15 and 78% of those aged 16-17 years had ever smoked.

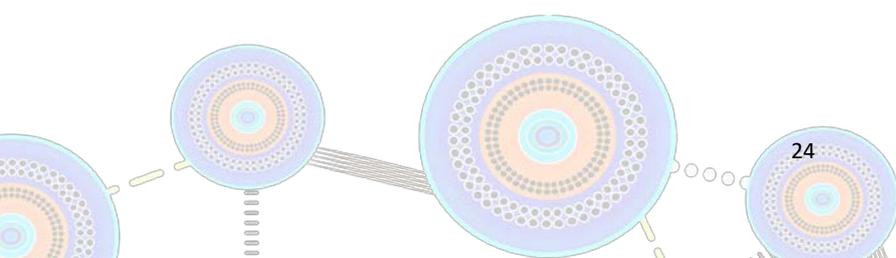
Around half of youth who had ever smoked cigarettes in their lifetime were current users. In 2017, 7% of youth aged 12-15 and 18% of those aged 16-17 years had smoked in the week preceding the survey. This is substantially lower than is observed in 1996, when 27% of youth aged 12-15 and 44% of those aged 16-17 years had smoked in the week preceding the survey.

Across survey years, smoking was more common in the older age group than in the younger age group.

Table 9. Published prevalence estimates of youth smoking behaviours, based on ASSAD surveys conducted between 1996 and 2017

	%							
	1996 (N=949)	1999 (N=863)	2002 (N=948)	2005 (N=673)	2008 (N=1,284)	2011 (N=1,242)	2014 (N=1,351)	2017 (N=1,225)
12-15 years								
Ever smoked cigarettes	61	61	50	47	36	31	32	24
Smoked tobacco in past four weeks	30	32	22	20	17	12	14	11
Smoked tobacco in past seven days	27	28	19	17	14	10	10	7
Smoked tobacco on three of past seven days	19	22	14	14	--	--	--	--
16-17 years								
Ever smoked cigarettes	78	76	75	66	57	55	51	45
Smoked tobacco in past four weeks	48	49	39	36	28	31	29	23
Smoked tobacco in past seven days	44	43	29	33	25	26	21	18
Smoked tobacco on three of past seven days	37	36	22	24	--	--	--	--

N indicates the total number of Aboriginal and Torres Strait Islander students participating in the survey, where this information was provided. -- indicates that published data were not available. 1996-2005 data drawn from White et al.²⁵, replicated in Scollo et al.²⁸ Survey years may not be directly comparable due to differences in survey scope.^{27,28} Estimates for 2008 to 2017 comes from Heris et al.²⁷



Discussion

Adult cigarette use

Smoking prevalence is high in the Aboriginal and Torres Strait Islander population, stemming from colonial processes which introduced and entrenched commercial tobacco use in the population.¹ Based on 2018/19 survey data, one-third of Aboriginal and Torres Strait Islander adults have never smoked. The remaining two-thirds are either current tobacco smokers (40.2% smoke daily and 3.1% smoke less frequently) or past smokers (24.0%). This constitutes over 300,000 adults at risk of smoking-related morbidity and mortality.

There has been substantial progress in reducing cigarette smoking prevalence among adults since 1994. Despite decreasing prevalence, the absolute number of smokers has increased due to population growth. Adult current smoking (including daily and less-than-daily combined) prevalence decreased by 11.1 percentage points over the period, down to 43.3%. The majority of the observed decline in adult current smoking prevalence – 9.8 percentage points – occurred between 2002 and 2018/19. Over this period, daily smoking prevalence decreased by over 10.7 percentage points (10.7%; 7.2,14.2), from 50.9% to 40.2%, and there was no material change in less-than-daily smoking prevalence (non-significant increase of 0.9%).

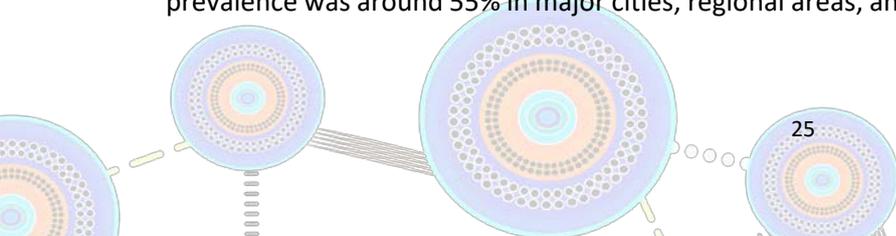
From 1994 to 2018/19, the most notable prevalence reductions (15 percentage points) were observed in the 18-24-year and 25-34-year age groups. Over this period there were non-significant decreases in current smoking prevalence for adults aged 35-54 years and ≥65 years, and a non-significant increase in current smoking prevalence for adults aged 55-64 years. These findings might be reflective of increasing average life expectancy over this period,²⁹ with adults surviving (and some smoking) to an older age. These findings could also reflect cohort effects; birth cohort analyses, following smoking prevalence across the life course, would be required to separate cohort effects from temporal trends. When focusing on the 2002 to 2018/19 period, significant declines in current daily smoking prevalence are observed for younger age groups (18-24, 25-34, and 35-44 years), alongside no material change in the prevalence of less-than-daily smoking (noting wide confidence intervals due to small samples in the older age groups).

Given the age distribution of the population, there are still large absolute numbers of smokers in these younger age groups – 98,000 aged under 35 years – despite the smoking prevalence declines observed. It is critical to continue to focus on further reductions in smoking prevalence for younger adults, complemented by increased efforts to reduce smoking prevalence for older adults. Quitting cigarette smoking at any age is beneficial, with earlier cessation imparting larger health benefits.⁹

A unique feature of the Aboriginal and Torres Strait Islander smoking epidemic is the high smoking prevalence among females.³⁰ While smoking prevalence was significantly higher among males than females at our first available data point (1994), smoking prevalence for females was still high, with one in two (50.9%; 48.0,53.9) females being current smokers. A high smoking prevalence is also observed among Māori females. It is possible that this relates to the colonial processes of introducing and entrenching tobacco use (such as their inclusion in rations), which may have normalised tobacco use by males and females early in the tobacco epidemic.

Between 1994 and 2018/19, current smoking prevalence decreased for both males and females, down to 45.7% (42.0,49.4) and 41.1% (38.3,44.0), respectively. The slight narrowing of the gap in female compared to male smoking prevalence since 1994 might reflect women's increasing economic participation, marketing targeted at women, and/or other factors.³¹ Today, there are close to an equal number of male (107,000) and female (104,000) smokers. There is a clear need to support further smoking prevalence reductions for both males and females. Females of reproductive age are a particular priority group, to reduce the impacts of smoking during pregnancy on the next generation.

In 1994, there was no significant difference in smoking prevalence by level of remoteness: smoking prevalence was around 55% in major cities, regional areas, and remote areas. However, trends varied



by remoteness, and in 2018/19, current smoking prevalence was significantly lower in major cities (31.8%) than in regional areas (46.4%) and remote areas (59.3%). This reflects a >20 percentage point decrease in current smoking prevalence in major cities, almost 10 percentage point decrease in regional areas, and a significant 5 percentage point increase in remote areas. In 2018/19, the majority of current smokers lived in regional areas (96,000); this is close to the combined number of current smokers living in major cities (59,000) and remote settings (56,000). Accelerating reductions in regional settings will have the largest impact in terms of the absolute numbers of smokers. Increased efforts and targeted strategies are required to ensure that people in remote and very remote areas can also enjoy the benefits from reduced smoking prevalence.

Reports have focused on prevalence trends for remote areas compared to “non-remote” (combining major cities and regional areas) areas.^{10,11,32} However, combining major cities and regional areas obscures differences in trends between these two groups, and underestimates the progress that is occurring within major cities. By looking at data for major cities and regional areas separately, we identify that the percentage point reduction in major cities from 1994 was more than double that in regional areas (22.5% compared to 8.3%). Further disaggregation, where statistical power allows, would provide additional insight.

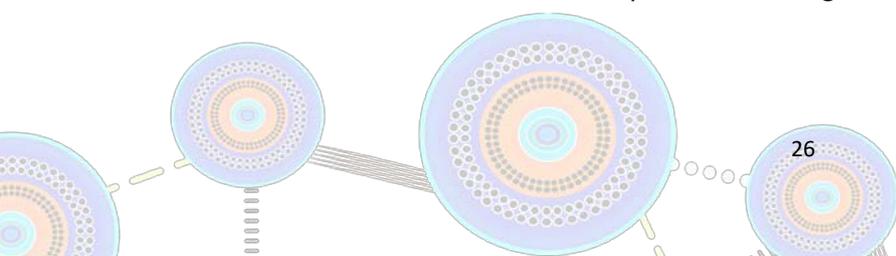
Between 2002 and 2018/19, the observed non-significant increase in current smoking in remote areas reflects a significant increase in less-than-daily smoking, alongside no detectable change in daily smoking prevalence. The confidence intervals around the estimated change in remote areas are wide due to the relatively small sample size; for example, the estimated change in daily smoking prevalence from 2002 to 2018/19 was a 0.4 percentage point decrease, with the lower bound a 5.3 percentage point decrease, and the upper bound a 4.5 percentage point increase. On the basis of these findings, we cannot exclude a decrease (or an increase) in daily smoking prevalence in remote areas over this 16-17-year period. Increased sample sizes in remote areas would increase our ability to detect prevalence changes.¹⁰

Less-than-daily smoking is most common in remote settings, in terms of percentage of all adults in remote settings (7.1%), percentage of all current smokers in remote settings (12.0%), and absolute number of adults (7,000). Less-than-daily smoking might reflect efforts to reduce tobacco use, financial barriers to smoking daily, smoking only in social settings, or other factors. Less-than-daily smoking is still associated with health harms. Research could shed light on what underlies less-than-daily smoking, and what is driving changes in prevalence over time.

Focusing on any current smoking (combining daily and less-than-daily) may not provide an accurate representation of trends, particularly within remote areas. This demonstrates the importance of looking at smoking status in more detail to better understand patterns in current smoking and to inform tobacco control interventions, evaluation, and continuous quality improvement. Where policies require a single target, we recommend focusing on daily smoking, rather than all current smoking combined.

Quantifying trends by both sex and remoteness provides additional insight: we observed sex differences in smoking trends within remote areas from 1994 to 2018/19. Over this period, current smoking prevalence in remote areas stayed relatively constant for males, but increased significantly for females, approaching the male prevalence level. The divergent trends for males and females might reflect relative increases in life expectancy for females compared to males in remote areas, increasing disposable income for females, a shift from chewing tobacco to smoking tobacco, or other factors. When focusing on the period from 2002-2018/19, we observe no material change in daily smoking prevalence for females and males in remote areas, alongside a significant increase in less-than-daily smoking. This suggests that females and males in remote areas may need targeted supports and programs in order to reduce smoking prevalence. Further research to understand the age patterning of smoking in this context would be valuable.

Analysis at more disaggregated levels, such as by sex and remoteness, is only possible where sample sizes are large enough to provide sufficient statistical power. Increasing sample sizes in remote and very remote areas would increase our ability to detect changes in smoking prevalence.¹⁰



Adult e-cigarette use

E-cigarette use by adults was generally uncommon, including when compared to cigarette use. Less than one in ten (8.1%; 6.7,9.4) Aboriginal and Torres Strait Islander adults had ever used e-cigarettes; this corresponds to 39,000 adults – in comparison to the over 300,000 ever (current and past combined) cigarette smokers in 2018/19. The majority of those who had ever tried e-cigarettes were *not* currently using e-cigarettes, or (to their knowledge) using e-cigarettes containing nicotine. E-cigarette use was concentrated among younger adults, with prevalence of lifetime use 2-3-fold among those aged 18-24 and 25-44 years compared to those aged ≥ 45 years. There were no significant differences in patterns of e-cigarette use by sex.

In contrast to cigarette use, e-cigarette use was significantly and substantially more common (three- to four-fold) in major cities and regional areas compared to remote areas. It is likely that the limited accessibility of e-cigarettes in more remote settings contributes to the lower prevalence of use. Given the cross-sectional nature of the data, we cannot identify if patterns of e-cigarette use reflect the use of e-cigarettes as a tool for smoking cessation in major cities and regional areas, uptake of e-cigarettes by non-smokers in major cities and regional areas, or a combination of these. It was beyond the scope of this review to examine e-cigarette use in relation to cigarette use. Further research could explore how e-cigarette use relates to smoking initiation and cessation for Aboriginal and Torres Strait Islander peoples, using the 2018/19 NATSIHS and other datasets.

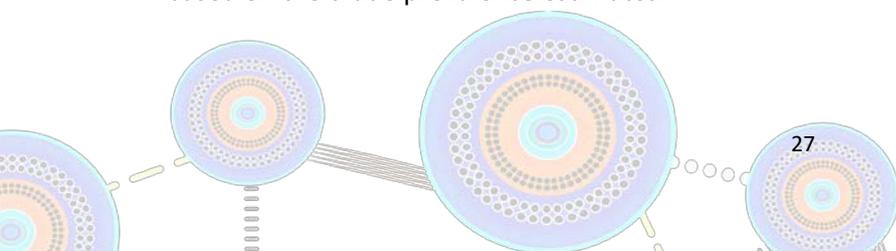
The inclusion of questions about e-cigarettes in the 2018/19 NATSIHS has enabled assessment of prevalence relatively early in the period since introduction of e-cigarettes into the population. A limitation of the questions asked about the use of nicotine-containing e-cigarettes, was questions were asked in the illicit drug use section, separately from the other questions about use of cigarettes and (non-nicotine-containing) e-cigarettes. This may contribute to under-reporting of use of nicotine-containing e-cigarettes, compared to if the question was asked together with other questions about e-cigarettes. Further, there is only one question asked about nicotine-containing e-cigarette use, and it asks about use in the past year. This does not align with the questions about other e-cigarette use, which ask about ever use and current use. Given the available data, we cannot examine how use of nicotine-containing e-cigarettes in the last year relates to use of non-nicotine-containing e-cigarettes over the same time period, and we do not have a measure of ever use of nicotine-containing e-cigarettes. Harmonisation of survey items would facilitate data interpretation.

There is a diverse and evolving range of e-cigarette products, which carry unique risks. We recommend asking comprehensive questions about a range of e-cigarette products and patterns of use, to capture this diversity of products and enable measurement of their potential benefits and harms. We recommend timely monitoring of trends in the use of these products.

Youth cigarette and e-cigarette use

Our analysis of ABS survey data identified bias in the data on youth smoking behaviours, in relation to adult presence at interview. Given that the vast majority of youth smoking data were collected with an adult present, these survey data are possibly biased to a large degree. We recommend thorough investigation of this bias before using data collected by these methods. The magnitude of this bias should be considered when using these data to estimate point prevalence, to quantify trends over time, or to conduct comparisons with other population.

Youth smoking prevalence is likely to be greater than suggested by ABS survey estimates. Based on 2018/19 NATSIHS data, 16.4% of youth aged 15-17 years (around 8,000 youth) had ever smoked, and 3.8% (around 2,000 youth) had ever used e-cigarettes. The findings from ASSAD data – for example, the 24% prevalence of ever smoking for youth aged 12-15 years and 45% for youth aged 16-17 years – support the assertion that prevalence estimates from the ABS surveys are likely underestimates. We may therefore require additional resourcing to achieve the level of non-initiation that was assumed based on the crude prevalence estimates.



The ASSAD data may be relatively less subject to this reporting bias, due to the data collection method. However, these data are potentially subject to other biases; for example, as described earlier, the limited survey scope likely leads to an underestimation of smoking prevalence. The generalisability of these findings should be explored in more depth, to ascertain the validity of these data in identifying prevalence estimates and trends for Aboriginal and Torres Strait Islander youth. With that caveat in mind, the ASSAD data indicate a substantial decrease in youth (aged 12-17 years) cigarette use from 1996 to 2017.

These same biases may occur in surveys of the non-Indigenous population that use similar data collection methods. Our findings demonstrate that it is important to collect data on youth smoking behaviours through self-report, in a confidential manner. To achieve this within the ABS surveys would require both increasing the number of youth who are present at interview, and increasing caregivers' willingness to have the child self-report without an adult present (or report the data confidentially while the adult is present). The validity of other national sources of data on youth smoking behaviours (such as the Mayi Kuwayu Study and LSIC) should be explored.

Limitations

For the purposes of this report, the ABS survey data has been categorised into the broad geographic groups of major cities, inner and outer regional areas, and remote and very remote areas. This crude categorisation does not reflect the diverse contexts of Aboriginal and Torres Strait Islander communities. It may be more useful to examine differences between meaningful self-determined groupings, such as mob, although this may be limited by availability of variables and sample size.

The changes across ABS surveys in the scope, sample design, coverage, questions asked and category definitions make it difficult to confidently assess trends in smoking behaviours, a problem compounded by the absence of data before 1994. It is also important to note that prevalence estimates presented here may contrast with the findings of other analyses that used different categorisations of smoking status, age groups, or remoteness.

We have already discussed the bias inherent in the youth smoking data from the ABS surveys, and our inability to confidently generalise the findings from ASSAD analyses to all Aboriginal and Torres Strait Islander youths. There is also potential for social desirability bias in the adult smoking and e-cigarette data, which would lead to underestimation of the true prevalence. This is particularly likely for nicotine-containing e-cigarettes, given that in Australia it is currently illegal to sell e-cigarettes containing nicotine.³³ However, in the current policy and retail environment, people who use e-cigarettes may not be aware of whether a product contains nicotine; some products that are labelled as 'nicotine free' may include nicotine.³³

Implications for data collection, policy targets, and reporting

1. The Aboriginal and Torres Strait Islander smoking epidemic is distinct from the non-Indigenous smoking epidemic. Further, there is great diversity within the Aboriginal and Torres Strait Islander population. The current evidence demonstrates the need to:
 - a. Create explicit interim targets specific to Aboriginal and Torres Strait Islander smoking prevalence within the Long Term National Health Plan target of reducing smoking prevalence in the total Australian population below 10 per cent by 2025.
 - b. Create specific smoking reduction targets for Aboriginal and Torres Strait Islander adults in major cities, regional areas, and remote areas, as well as having a single target for all Aboriginal and Torres Strait Islander adults, to more accurately reflect diverse structures and needs, and the divergent trends in smoking prevalence.
2. We identified a substantial potential for bias when youth smoking data is collected by an adult proxy or with an adult present, compared to self-reported by youth on their own. This is not an issue restricted to Aboriginal and Torres Strait Islander health surveys; it is also likely to impact on total population surveys. The current evidence demonstrates the need to:
 - a. Conduct an in-depth evaluation of the extent of bias introduced by collecting data on youth smoking behaviours with adults present.

- b. Acknowledge the limitations in any use of data collected by this method, and exercise caution in using these data to measure progress against targets.
 - c. Assess the suitability of available data sources for measuring and monitoring national prevalence and trends in youth cigarette and e-cigarette use.
 - d. Improve the validity of data on youth smoking behaviours, such as having youth self-report their smoking and e-cigarette behaviours confidentially.
3. Combining major cities and regional areas obscures differences in trends between these two groups and underestimates the progress that is occurring within major cities. The current evidence demonstrates the need to:
 - a. Report data separately for major cities, regional areas, and remote areas (rather than presenting data for all 'non-remote' areas combined), to more accurately reflect the diverse contexts, including smoking behaviours, health and wellbeing infrastructure, and social and economic opportunities.
 - b. Ensure data collections adequately sample remote and very remote settings, to ensure statistical power is sufficient to quantify prevalence estimates and trends for these groups
4. Focusing on any current smoking (combining daily and less-than-daily) may provide an inaccurate or nuanced representation of trends in smoking behaviours, particularly within remote areas. The current evidence demonstrates the need to:
 - a. Examine prevalence and trends in both current daily smoking and less-than-daily smoking.
 - b. Focus policy targets on current daily smoking, rather than any current smoking (daily and less-than-daily combined), where a single target is required.
5. There is a diverse and evolving range of e-cigarette products, which carry unique risks. The current evidence demonstrates the need to:
 - a. Ask comprehensive and harmonised questions about a range of e-cigarette products and patterns of use.
 - b. Conduct timely monitoring of trends in the use of these products.

Implications for further research

Rigorous evidence about what works to reduce smoking prevalence is required. An evaluation of the effectiveness of the Tackling Indigenous Smoking regional grants program is underway, and will contribute to this body of evidence. An ongoing framework for monitoring and evaluating this national policy would contribute to the generation of timely evidence and continuous quality improvement.

Work is underway to quantify the mortality risks from past and current smoking specific to Aboriginal and Torres Strait Islander people, and the contribution of smoking to mortality at the population level. The current evidence demonstrates the value of:

1. Modelling future trends in smoking behaviours, in order to project likely changes over time and outcomes under different tobacco control scenarios. If combined with estimates of mortality risks specific to Aboriginal and Torres Strait Islander peoples (from research underway), these models could predict potential lives saved if reductions in smoking prevalence were accelerated.
2. Support for research to understand the national prevalence of youth cigarette and e-cigarette use through:
 - a. The improvement of Aboriginal and Torres Strait Islander data collections, as above;
 - b. Examining the generalisability of findings drawn from the ASSAD data;
 - c. Publication of analyses of e-cigarette use in ASSAD data; and,
 - d. Exploring the potential to apply population-weighting methods and/or to generate a synthetic population using existing longitudinal data assets (e.g. Mayi Kuwayu: the national study of Aboriginal and Torres Strait Islander wellbeing).
3. Support for research examining how e-cigarette use interacts with cigarette use (e.g. as a smoking cessation tool and/or as a gateway to cigarette use), and examining factors that predict youth and adults use of cigarettes and e-cigarettes, to inform targets for intervention. This could be achieved through a combination of analysis of ABS cross-sectional survey data and longitudinal data from the Mayi Kuwayu Study and the national Longitudinal Study of Indigenous Children (LSIC).

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