# Who smokes in Australia? Cross-sectional analysis of Australian Bureau of Statistics survey data, 2017–19

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**The known**: Earlier studies — which were comparative — have identified groups of people more likely to smoke, contributing to perceptions that smokers are largely uneducated, unemployed, and prone to poor mental health.

**The new**: In 2017–19, more than half of the adult respondents to an Australian survey who smoked every day were 25–54 years old, born in Australia, living in major cities, and in good physical and mental health; an estimated 92% were non-Indigenous people. Most working age people who smoked daily had completed high school and had paid jobs.

**The implications**: Our national profile facilitates an evidence-based profile of people who smoke that can inform population and targeted interventions for reducing tobacco use.


## Abstract

**Objectives**: To assess the socio-demographic and health-related characteristics of people who smoke daily, people who formerly smoked, and people who have never smoked in Australia.

**Study design**: Cross-sectional analysis of Australian Bureau of Statistics (ABS) survey data.

**Setting, participants**: Adult participants (16 370 people aged 18 years or older) in the ABS 2017–18 National Health Survey (NHS); adult participants in the ABS 2018–19 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) (6423 people aged 18 years or older).

**Main outcome measures**: Socio-demographic and health-related characteristics of people who smoke daily, people who formerly smoked, and people who have never smoked, expressed as population-weighted proportions, overall and by Indigeneity.

**Results**: Among adult NHS respondents, an estimated 58.8% of people who smoked daily (95% confidence interval [CI], 56.2–61.4%) were men, 61.3% (95% CI, 58.7–63.9%) were 25–54 years old, 72.5% (95% CI, 70.0–74.8%) were born in Australia, and 65.4% (95% CI, 62.8–67.8%) lived in major cities and 54.3% (95% CI, 51.6–57.0%) in areas in the two socio-economically most disadvantaged quintiles; 75.9% (95% CI, 73.5–78.1%) reported good to excellent health, 73.0% (95% CI, 70.5–75.4%) reported low to moderate psychological distress, 69.0% of those aged 25–64 years (ie, of working age) had completed year 12 (high school), and 68.5% were currently employed. An estimated 2.57 million people smoke daily in Australia: 2.37 million non-Indigenous people (92%) and 195 700 Aboriginal or Torres Strait Islander people (8%).

**Conclusions**: While smoking is more frequent among people living in socio-economically disadvantaged areas and in certain population sub-groups, this first quantitative national profile indicates that most people who smoke daily are in paid employment, are non-Indigenous, are in good physical and mental health, and have completed year 12. Improved comprehensive structural supply- and demand-based tobacco control, informed by the needs of priority groups and the overall profile of people who smoke, is needed to reduce daily smoking prevalence among adults to the 2030 targets of 5% or less for all Australians and 27% or less for Aboriginal and Torres Strait Islander people.


Tobacco smoking is a major risk factor for illness and premature death in Australia, and it is an important cause of health inequity.[1,2] In 2018, it was estimated that 3.1 million years of life, 6 million quality-associated life-years, and $388 billion in productivity would be lost to smoking for people aged 20–69 years (followed to age 70 years).[3] The National Preventive Health Strategy has 2030 targets of reducing the prevalence of daily smoking to 5% or less of adult Australians, and to 27% or less of Aboriginal and Torres Strait Islander people aged 15 years or more.[4]

Improved and accelerated implementation of the measures in the World Health Organization Framework Convention on Tobacco Control[5] will be needed to achieve these targets. A quantitative population profile of people who smoke would enhance tobacco control by improving our understanding of their characteristics and informing the targeting of interventions; it could also reduce the stigmatisation of people who smoke.[6]

No quantitative population profiles of people who smoke have been published in Australia or overseas. Studies that have compared the characteristics of people who do or do not smoke have found that men, middle-aged people, and people living in areas of lower socio-economic status or greater remoteness are more likely to smoke.[7-9] In Australia, the prevalence of tobacco use is also greater among Indigenous people because of colonisation, racism, and structural disadvantage.[10] The tobacco industry, responsible for the extensive use of its addictive products around the world, has a history of targeting specific population groups. For example, when an R. J. Reynolds executive was asked in 1998 why he didn't smoke, he responded: "We don't smoke the shit. We just sell it. We reserve the right to smoke for the young, the poor, the black, and the stupid."[11] Consistent with this attitude, people who use tobacco are often stereotyped as being from specific ethnic groups, uneducated, unemployed, or mentally ill, particularly where smoking is no longer normalised in the general population. These perceptions can stigmatise and shame people who smoke and undermine effective tobacco control and health care.[6,12,13]

Further, comparative studies often do not take the intersectionality of smoking-related factors into account.[14] Understanding the interconnectedness of factors such as Indigeneity, socio-economic position, sex and gender, and geographic remoteness can identify systemic disadvantage that affect individuals and population groups and clarify who may benefit from particular support.[7-9,14]

In this study, we assessed the socio-demographic and health-related characteristics, both individually and in combination, of people who smoke daily, people who formerly smoked, and people who have never smoked in Australia, as indicated by nationally representative Australian Bureau of Statistics survey data collected during 2017–19.





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## Methods

The team who undertook the cross-sectional analysis described in this article included investigators with lived Indigenous experience and experience in tobacco research, epidemiology, and public health. Our approach took Indigenous world views and relationality into account, and social justice principles, including the right of all Australians to good health,[15,16] have informed the project from its conceptualisation to dissemination of results, with the aim of better informing evidence-based targeted tobacco control for reducing tobacco-related disease and death.

### Data sources and variables

We analysed response data for adult participants (18 years or older) in the Australian Bureau of Statistics (ABS) 2017–18 National Health Survey (NHS)[17] and adult participants in the ABS 2018–19 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS)[18] (further details: Supporting Information, part 1).

The three smoking status categories for our main analyses were people who smoke daily, people who formerly smoked but no longer smoke, and people who have never smoked. We extracted survey data on self-reported socio-demographic and health-related characteristics for NHS respondents, as well as postcode-level socio-economic status (Index of Relative Socio-economic Advantage and Disadvantage, IRSAD[19]) and remoteness (Australian Statistical Geographic Standard for Remoteness[20]) information for NHS and NATSIHS respondents (further details: Supporting Information, part 2). To assess intersectionality, selected variables were combined (selected *a priori*: for the NHS, sex and age, and sex and country of birth; for the NATSIHS, postcode-level remoteness and socio-economic status).

### Statistical analysis

For characteristics according to smoking category, we estimated weighted population proportions with 95% confidence intervals (CIs) in binomial models using survey-specific microdata (ie, individual-level survey response data). Person-level population weights (derived by the ABS, and available in the ABS DataLab) were applied to adjust proportions for deviations from population representativeness resulting from the survey sampling strategy and missing responses.

The numbers and proportions of the Indigenous and non-Indigenous people in each smoking category were estimated on the basis of ABS estimates for the Australian population in the NHS 2017–18 and the Indigenous population in the NATSIHS 2018–19 (further details: Supporting Information, part 3).

Sensitivity analyses examined the influence of broadening the outcome of interest from the socio-demographic characteristics of people who smoke daily with those of all people who currently smoke (daily, weekly, or less often), separately for NHS 2017–18 and NATSIHS 2018–19 respondents. We also examined the influence of different estimates of change in population size and smoking prevalence between the two surveys on our estimates (Supporting Information, part 3).

All data were accessed and analysed (using Stata 16) in the ABS DataLab (https://www.abs.gov.au/statistics/microdata-tablebuilder/datalab), which provides a secure environment that complies with the *Census and Statistics Act 1905 (Cth)*.

### Ethics approval

Aboriginal and Torres Strait Islander people were involved in reviewing the concept, design, and conduct of this project through *Thiitu Tharrmay*, a national Aboriginal and Torres Strait Islander research reference group that provides input, advice and guidance on work undertaken by the Tobacco Free program at the Australian National University (ANU), consistent with the National Health and Medical Research Council guideline for conducting ethical research with Aboriginal and Torres Strait Islander peoples.[21] The study was approved by the NSW Aboriginal Health and Medical Research Council (1730/20) and the ANU Human Research Ethics Committee (2021/424, 2014/208).

## Results

### The 2017–18 National Health Survey

Of 16 370 adult participants in the NHS 2017–18, 2453 people smoked daily (weighted proportion, 13.8%; 95% CI, 13.1–14.5%), 5384 had previously smoked (30.0%; 95% CI, 29.1–30.8%), and 8319 had never smoked (54.8%; 95% CI, 53.8–55.8%); 214 smoked less than daily (1.5%, 95% CI, 1.2–1.7%), a smoking category not further included in our analyses (Box 1).

#### Age, sex, place of birth

An estimated 58.8% of people who smoked daily were men (95% CI, 56.2–61.4%) and 72.5% were born in Australia (95% CI, 70.0–74.8%); 61.3% were aged 25–54 years (95% CI, 58.7–63.9%) (Box 1, Box 2). Men aged 25–34 years (13.2% of all people who smoked daily; 95% CI, 11.3–15.4%) and men aged 35–44 years (12.2%; 95% CI, 10.6–14.1%) comprised the largest proportions by combined age–sex category (Box 3). Men born in Australia (40.4%; 95% CI, 37.7–43.1) and women born in Australia (32.1%; 95% CI, 29.7–34.6%) comprised the largest proportions by combined place of birth–sex category; 18.4% (95% CI, 16.4–20.7%) of people who smoked daily were men born overseas and 9.1% (95% CI, 7.8–10.6%) were women born overseas (Supporting Information, table 1).

An estimated 56.6% of people who formerly smoked were men (95% CI, 54.9–58.3%), 71.6% were aged 35–74 years (95% CI, 70.0–73.2%), and 68.9% were born in Australia (95% CI, 67.3–70.4%) (Box 1, Box 2).

#### Residential location, household composition

An estimated 54.3% of people who smoked daily (95% CI, 51.6–57.0%) lived in areas in the two quintiles of greatest socio-economic disadvantage, 65.4% lived in major cities (95% CI, 62.8–67.8%) and 34.6% (95% CI, 32.1–37.3%) lived with dependent children. An estimated 69.1% of people who formerly smoked lived in major cities (95% CI, 67.6–70.6%), and their distribution by postcode-level socio-economic disadvantage quintile was fairly homogeneous; 34.3% (95% CI, 32.6–36.0%) lived with dependent children (Box 1).

#### Education, employment

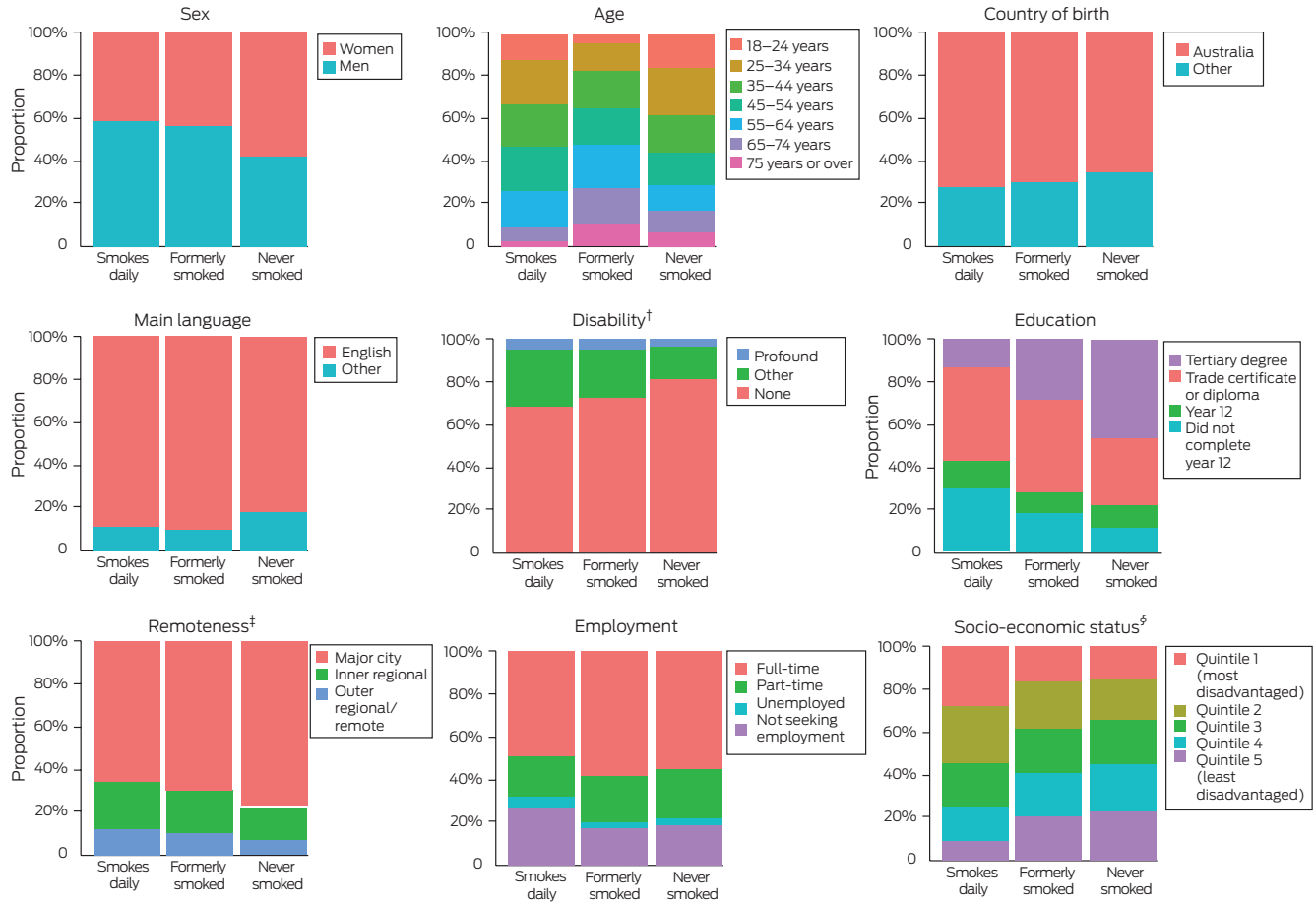
For an estimated 42.1% of people aged 25–64 years (ie, of working age) who smoked daily the highest educational qualification among those for whom educational attainment was known was a trade certificate or a diploma (95% CI, 39.1–45.2%); 13.3% had tertiary qualifications (95% CI, 11.4–15.6%), and 31.0% (95% CI, 28.3–33.9%) had not completed year 12 (high school). Of the

**1 Demographic characteristics of people who smoke daily, formerly smoked, or have never smoked, Australia, based on 2017–18 survey data***

| Characteristic | Weighted proportion (95% confidence interval) | | |
|---|---|---|---|
| | Smoke daily | Formerly smoked | Never smoked |
| Sex | | | |
| Men | 58.8% (56.2–61.4%) | 56.6% (54.9–58.3%) | 42.1% (40.7–43.5%) |
| Women | 41.2% (38.6–43.8%) | 43.4% (41.7–45.1%) | 57.9% (56.5–59.3%) |
| Age group (years) | | | |
| 18–24 | 12.2% (10.2–14.5%) | 3.9% (3.2–4.9%) | 16.1% (14.9–17.4%) |
| 25–34 | 20.7% (18.4–23.2%) | 13.3% (12.1–14.7%) | 22.0% (20.8–23.3%) |
| 35–44 | 20.0% (18.1–22.2%) | 16.7% (15.5–17.9%) | 17.0% (16.0–18.0%) |
| 45–54 | 20.6% (18.6–22.9%) | 17.8% (16.5–19.1%) | 15.4% (14.5–16.4%) |
| 55–64 | 16.6% (14.9–18.5%) | 19.3% (18.0–20.7%) | 12.5% (11.7–13.4%) |
| 65–74 | 6.8% (5.8–8.1%) | 17.8% (16.7–19.0%) | 9.6% (9.0–10.3%) |
| 75 or older | 2.9% (2.3–3.8%) | 11.1% (10.2–12.1%) | 7.3% (6.8–7.9%) |
| Country of birth | | | |
| Australia | 72.5% (70.0–74.8%) | 68.9% (67.3–70.4%) | 64.1% (62.8–65.5%) |
| Other | 27.5% (25.2–30.0%) | 31.1% (29.6–32.7%) | 35.9% (34.5–37.2%) |
| Main language | | | |
| English | 90.3% (88.4–92.0%) | 91.4% (90.2–92.4%) | 81.1% (79.9–82.2%) |
| Not English | 9.7% (8.0–11.6%) | 8.6% (7.6–9.8%) | 18.9% (17.8–20.1%) |
| Socio-economic status† | | | |
| Quintile 1 (most disadvantaged) | 28.5% (26.2–30.9%) | 16.7% (15.5–17.9%) | 15.5% (14.5–16.5%) |
| Quintile 2 | 25.8% (23.5–28.3%) | 21.2% (19.9–22.6%) | 18.8% (17.7–19.9%) |
| Quintile 3 | 20.4% (18.3–22.7%) | 20.2% (18.9–21.5%) | 20.7% (19.6–21.8%) |
| Quintile 4 | 14.8% (13.1–16.8%) | 21.1% (19.7–22.5%) | 22.1% (21.0–23.3%) |
| Quintile 5 (least disadvantaged) | 10.5% (8.7–12.5%) | 20.9% (19.4–22.4%) | 22.9% (21.7–24.2%) |
| Remoteness‡ | | | |
| Major city | 65.4% (62.8–67.8%) | 69.1% (67.6–70.6%) | 76.6% (75.5–77.7%) |
| Inner regional | 21.3% (19.2–23.7%) | 20.2% (18.9–21.6%) | 15.6% (14.7–16.6%) |
| Outer regional/remote | 13.3% (11.7–15.0%) | 10.6% (9.7–11.6%) | 7.8% (7.2–8.4%) |
| Household composition | | | |
| Living with dependent children | 34.6% (32.1–37.3%) | 34.3% (32.6–36.0%) | 43.5% (42.2–44.9%) |
| Living with others, but not dependent children | 44.9% (42.2–47.7%) | 49.2% (47.5–50.9%) | 44.3% (42.9–45.7%) |
| Living alone | 20.5% (18.8–22.2%) | 16.5% (15.6–17.5%) | 12.1% (11.5–12.8%) |
| Highest educational attainment§ | | | |
| Did not complete year 12 | 31.0% (28.3–33.9%) | 17.6% (16.0–19.3%) | 11.3% (10.2–12.4%) |
| Completed year 12 | 13.6% (11.6–15.8%) | 10.9% (9.6–12.4%) | 12.1% (11.0–13.2%) |
| Trade certificate/diploma | 42.1% (39.1–45.2%) | 41.9% (39.8–44.1%) | 29.3% (27.8–30.8%) |
| Tertiary degree | 13.3% (11.4–15.6%) | 29.6% (27.6–31.6%) | 47.4% (45.7–49.1%) |
| Employment status§ | | | |
| Working full-time | 49.1% (46.1–52.2%) | 58.6% (56.5–60.7%) | 55.1% (53.4–56.7%) |
| Working part-time | 19.4% (17.1–21.9%) | 22.0% (20.3–23.8%) | 24.3% (22.9–25.8%) |
| Unemployed, looking for work | 5.4% (4.1–6.9%) | 2.2% (1.7–3.0%) | 2.2% (1.7–2.8%) |
| Unemployed, not looking for work | 26.1% (23.6–28.7%) | 17.2% (15.7–18.8%) | 18.4% (17.1–19.7%) |

* Derived from Australian Bureau of Statistics 2017–18 National Health Survey data (respondents: 2453 people who smoke daily, 5384 who formerly smoked, and 8319 who have never smoked); proportions weighted at the person level.[17] † Australian Bureau of Statistics 2016 Index of Relative Socioeconomic Advantage and Disadvantage at the Statistical Area 1 level.[19] ‡ Australian Bureau of Statistics 2016 Australian Statistical Geographic Standard for remoteness.[20] § Includes only survey respondents aged 25–64 years (working age). ◆

**2 Demographic characteristics of people who smoke daily, formerly smoked, or have never smoked, Australia, based on 2017–18 survey data***




* Derived from Australian Bureau of Statistics 2017–18 National Health Survey data (respondents: 2453 people who smoke daily, 5384 who formerly smoked, and 8319 who have never smoked); proportions weighted at the person level.[17] The data for this figure are included in Box 1 and Box 4. † Response options: profound or severe core activity limitation; other (mild or moderate limitation, or limitation affecting education or employment); no disability or restrictive long term health condition. ‡ Australian Bureau of Statistics 2016 Australian Statistical Geographic Standard for remoteness.[20] § Australian Bureau of Statistics 2016 Index of Relative Socioeconomic Advantage and Disadvantage at the Statistical Area 1 level.[19] ◆

respondents of working age, 49.1% worked full-time (95% CI, 46.1–52.2%), 19.4% part-time (95% CI, 17.1–21.9%) (Box 1, Box 2).

### Health conditions, disability

An estimated 75.9% of people who smoked daily (95% CI, 73.5–78.1%) rated their health as good to excellent, and 73.0% (95% CI, 70.5–75.4%) reported low or moderate psychological distress (Box 4).

An estimated 24.4% of people who smoked daily reported asthma (95% CI, 22.2–26.9%) and 6.1% other respiratory conditions (95% CI, 5.0–7.5%). The proportions of respondents who reported each of the other chronic diseases were generally largest for people who had formerly smoked and smallest for people who had never smoked. Seven or more chronic health conditions were reported by 19.0% of people who smoked daily (95% CI, 17.1–21.1%), 21.0% of people who formerly smoked (95% CI, 19.7–22.3%), and 12.4% of people who had never smoked (95% CI, 11.6–13.2%) (Box 4).

An estimated 67.6% of people who smoked daily reported having no disability or restrictive health condition (95% CI, 65.1–70.0%), 27.0% reported mild or moderate limitations or restrictions affecting school attendance or employment (95% CI, 24.7–29.4%), and 5.4% reported profound or severe limitations (95% CI, 4.4–6.6%); the proportions were similar for people who had formerly smoked but were smaller for people who had never smoked (Box 2, Box 4).

## The 2018–19 National Aboriginal and Torres Strait Islander Health Survey

Of the 6423 NATSIHS 2018–19 adult respondents included in our analysis, 2808 smoked daily (weighted proportion 40.2%; 95% CI, 38.1–42.4%), 1529 formerly smoked (24.0%; 95% CI, 22.1–25.9%), and 1866 had never smoked (32.7%; 95% CI, 30.6–34.9%); 220 smoked less frequently than daily (3.1%, 95% CI, 2.5–3.9%), a smoking category not further included in our analyses. An estimated 74.9% of people who smoked daily (95% CI, 72.7–77.0%) lived in major cities or inner or outer regional areas, and 66.0% (95% CI, 62.5–69.2%) lived in areas in the most disadvantaged socio-economic quintile (Box 5).

People living in areas in the socio-economically most disadvantaged quintile and in inner or outer regional areas (32.6%; 95% CI, 29.6–35.8%), in remote or very remote areas (20.4%; 95% CI, 18.5–22.4%), or major cities (12.9%; 95% CI, 11.0–15.2%) comprised the largest proportions of people who smoked daily by combined postcode-level remoteness–socio-economic status category (Box 6).

**3 Sex–age (combined category) characteristics of people who smoke daily, formerly smoked, or have never smoked, Australia, based on 2017–18 survey data***

| Sex/age group (years) | Weighted proportion (95% confidence interval) | | |
|---|---|---|---|
| | Smoke daily | Formerly smoked | Never smoked |
| All respondents | | | |
| Men | | | |
| 18–24 | 7.7% (6.1–9.8%) | 2.3% (1.7–3.1%) | 7.6% (6.7–8.6%) |
| 25–34 | 13.2% (11.3–15.4%) | 7.3% (6.4–8.4%) | 9.6% (8.7–10.5%) |
| 35–44 | 12.2% (10.6–14.1%) | 9.1% (8.2–10.2%) | 7.3% (6.6–8.0%) |
| 45–54 | 11.4% (9.8–13.3%) | 9.1% (8.1–10.1%) | 6.9% (6.3–7.6%) |
| 55–64 | 8.9% (7.6–10.3%) | 11.1% (10.0–12.3%) | 5.0% (4.4–5.6%) |
| 65–74 | 3.7% (3.0–4.7%) | 10.8% (9.9–11.8%) | 3.4% (3.0–3.8%) |
| 75 or older | 1.7% (1.1–2.4%) | 6.9% (6.1–7.7%) | 2.3% (2.0–2.7%) |
| Women | | | |
| 18–24 | 4.5% (3.4–5.9%) | 1.6% (1.2–2.3%) | 8.5% (7.6–9.5%) |
| 25–34 | 7.5% (6.1–9.1%) | 6.0% (5.2–7.0%) | 12.5% (11.5–13.4%) |
| 35–44 | 7.8% (6.6–9.2%) | 7.5% (6.7–8.4%) | 9.7% (9.0–10.5%) |
| 45–54 | 9.2% (7.9–10.8%) | 8.7% (7.8–9.7%) | 8.5% (7.8–9.2%) |
| 55–64 | 7.8% (6.7–9.1%) | 8.2% (7.4–9.2%) | 7.5% (6.9–8.2%) |
| 65–74 | 3.1% (2.4–4.0%) | 7.0% (6.3–7.8%) | 6.2% (5.7–6.8%) |
| 75 or older | 1.3% (0.9–1.8%) | 4.3% (3.7–4.9%) | 5.0% (4.6–5.5%) |

* Derived from Australian Bureau of Statistics 2017–18 National Health Survey data (respondents: 2453 people who smoke daily, 5384 who formerly smoked, and 8319 who have never smoked); proportions weighted at the person level.[17] ◆

### Estimated numbers of people in each smoking category, by Indigeneity

We estimated the numbers of Indigenous and non-Indigenous people who smoked daily, formerly smoked, or had never smoked on the basis of data from the NHS 2017–18 and the NATSIHS 2018–19. An estimated 2.57 million people smoked daily in Australia: 2.37 million non-Indigenous people (92%) and 195 700 Aboriginal or Torres Strait Islander people (8%). Of the estimated 5.44 million people who formerly smoked, an estimated 5.32 million were non-Indigenous people (98%) and 116 700 Aboriginal or Torres Strait Islander people (2%) (Box 7). For non-Indigenous respondents, intersectionality of postcode-based socio-economic status and remoteness was similar to that for the total Australian population. Specifically, the largest proportions of people who smoked daily lived in major cities and the two socio-economically most disadvantaged quintiles (Supporting Information, table 2).

### Sensitivity analyses

Among the NHS 2017–18 respondents who currently smoked, the socio-demographic characteristics of people who smoked daily were similar to those who currently smoked (2667 people smoked daily, weekly, or less frequently) (Supporting Information, table 3). Among the NATSIHS 2018–19 respondents who currently smoked, the proportions by combined postcode-based remoteness–socio-economic status category were similar for the people who smoked daily and for those who currently smoked (3028 people) (Supporting Information, table 4).

The estimated proportions of people who currently smoked (any frequency) who were Indigenous or non-Indigenous people were similar to those for people who smoked daily (Supporting Information, table 5). In sensitivity analyses, different assumptions regarding change to population size and smoking prevalence between the two surveys did not markedly affect the proportions of Indigenous and non-Indigenous people for each smoking category (Supporting Information, table 6).

## Discussion

Tobacco companies sell an addictive, deadly product to more than 2.5 million Australians. Based on the survey data we examined, most adults who smoked daily in 2017–18 had completed year 12 and were in good physical and mental health, despite popular perceptions; an estimated 92% were non-Indigenous people, 58.8% were men, 61.3% were 25–54 years old, 72.5% were born in Australia, and 54.3% lived in areas in the two socio-economically most disadvantaged quintiles; 68.5% of those of working age were in paid employment.

Lower level of educational attainment has been associated with increased likelihood of smoking,[9] but we found that 69.0% of working age people who smoked daily had completed year 12. In Australia, smoking is more prevalent in certain occupational groups (logistics, hospitality, construction and mining),[22] consistent with our finding that the highest educational attainment for 42.1% of people who smoke daily was a trade qualification or diploma; occupation-based interventions could therefore be useful as adjuncts to measures for reducing general population smoking levels.

Most respondents who smoked daily reported good to excellent health (75.9%) and low to moderate psychological distress (73.0%). The proportions who reported chronic conditions were

**4 Health-related characteristics people who smoke daily, formerly smoked, or have never smoked, Australia, based on 2017–18 survey data***

| Characteristic | Weighted proportion (95% confidence interval) | | |
|---|---|---|---|
| | Smoke daily | Formerly smoked | Never smoked |
| All respondents | | | |
| Self-reported health | | | |
| Excellent | 10.4% (8.9–12.1%) | 17.4% (16.1–18.8%) | 24.3% (23.1–25.6%) |
| Very good | 29.0% (26.6–31.5%) | 35.1% (33.5–36.8%) | 37.0% (35.7–38.3%) |
| Good | 36.5% (33.9–39.1%) | 30.0% (28.5–31.5%) | 26.9% (25.7–28.2%) |
| Fair | 17.4% (15.4–19.7%) | 12.7% (11.7–13.9%) | 9.0% (8.2–9.8%) |
| Poor | 6.7% (5.6–7.9%) | 4.7% (4.1–5.4%) | 2.8% (2.4–3.2%) |
| Psychological distress (Kessler–10) | | | |
| Low (10–15) | 47.9% (45.2–50.7%) | 64.9% (63.2–66.5%) | 67.2% (65.8–68.5%) |
| Moderate (16–21) | 25.1% (22.8–27.6%) | 22.6% (21.2–24.1%) | 22.3% (21.1–23.5%) |
| High (22–29) | 15.9% (13.9–18.0%) | 8.5% (7.6–9.4%) | 8.0% (7.3–8.8%) |
| Very high (30–50) | 11.1% (9.4–13.0%) | 4.0% (3.4–4.8%) | 2.5% (2.1–3.0%) |
| Asthma | | | |
| No | 75.6% (73.1–77.8%) | 77.9% (76.5–79.3%) | 81.1% (80.0–82.2%) |
| Yes | 24.4% (22.2–26.9%) | 22.1% (20.7–23.5%) | 18.9% (17.8–20.0%) |
| Other respiratory conditions | | | |
| No | 93.9% (92.5–95.0%) | 95.8% (95.1–96.4%) | 98.4% (98.1–98.7%) |
| Yes | 6.1% (5.0–7.5%) | 4.2% (3.6–4.9%) | 1.6% (1.3–1.9%) |
| Diabetes | | | |
| No | 89.3% (87.7–90.7%) | 85.4% (84.2–86.6%) | 90.4% (89.6–91.1%) |
| Yes | 10.7% (9.3–12.3%) | 14.6% (13.4–15.8%) | 9.6% (8.9–10.4%) |
| Chronic kidney disease | | | |
| No | 99.3% (98.9–99.6%) | 98.3% (97.9–98.7%) | 99.0% (98.7–99.2%) |
| Yes | 0.7% (0.4–1.1%) | 1.7% (1.3–2.1%) | 1.0% (0.8–1.3%) |
| Cardiovascular disease | | | |
| No | 81.0% (78.9–82.9%) | 71.9% (70.4–73.3%) | 81.7% (80.7–82.7%) |
| Yes | 19.0% (17.1–21.1%) | 28.1% (26.7–29.6%) | 18.3% (17.3–19.3%) |
| Cancer | | | |
| No | 89.7% (88.1–91.1%) | 84.1% (82.9–85.2%) | 90.5% (89.7–91.2%) |
| Yes | 10.3% (8.9–11.9%) | 15.9% (14.8–17.1%) | 9.5% (8.8–10.3%) |
| Hypertension | | | |
| No | 68.0% (65.5–70.4%) | 56.9% (55.2–58.5%) | 70.7% (69.5–71.9%) |
| Yes | 32.0% (29.6–34.5%) | 43.1% (41.5–44.8%) | 29.3% (28.1–30.5%) |
| Arthritis | | | |
| No | 81.2% (79.2–83.0%) | 73.7% (72.2–75.1%) | 84.0% (83.0–84.9%) |
| Yes | 18.8% (17.0–20.8%) | 26.3% (24.9–27.8%) | 16.0% (15.1–17.0%) |
| Other musculoskeletal conditions | | | |
| No | 67.5% (64.9–69.9%) | 66.7% (65.1–68.2%) | 76.8% (75.7–77.9%) |
| Yes | 32.5% (30.1–35.1%) | 33.3% (31.8–34.9%) | 23.2% (22.1–24.3%) |
| Osteoporosis or osteopenia | | | |
| No | 96.7% (95.7–97.4%) | 93.9% (93.1–94.6%) | 95.3% (94.7–95.7%) |
| Yes | 3.3% (2.6–4.3%) | 6.1% (5.4–6.9%) | 4.7% (4.3–5.3%) |

Continues

## 4 Continued

| Characteristic | Weighted proportion (95% confidence interval) | | |
|---|---|---|---|
| | Smoke daily | Formerly smoked | Never smoked |
| Chronic condition groups† | | | |
| 0 | 37.3% (34.6–39.9%) | 37.3% (35.6–39.0%) | 51.9% (50.5–53.2%) |
| 1 | 29.7% (27.2–32.3%) | 31.5% (29.9–33.1%) | 28.0% (26.7–29.2%) |
| 2 | 19.3% (17.3–21.5%) | 15.7% (14.6–16.9%) | 11.9% (11.1–12.8%) |
| 3 or more | 13.8% (12.2–15.6%) | 15.5% (14.4–16.7%) | 8.2% (7.6–9.0%) |
| Chronic conditions | | | |
| 0 | 13.0% (11.2–15.2%) | 7.6% (6.7–8.6%) | 14.9% (13.9–16.0%) |
| 1 | 14.8% (13.0–16.9%) | 13.9% (12.7–15.2%) | 19.2% (18.1–20.3%) |
| 2 | 15.1% (13.2–17.2%) | 14.3% (13.2–15.6%) | 18.1% (17.0–19.2%) |
| 3 | 12.2% (10.5–14.1%) | 13.9% (12.7–15.1%) | 13.9% (13.0–14.9%) |
| 4 | 10.7% (9.1–12.5%) | 11.6% (10.5–12.7%) | 9.3% (8.5–10.1%) |
| 5 | 8.2% (6.9–9.8%) | 10.8% (9.8–11.9%) | 7.3% (6.6–8.0%) |
| 6 | 6.9% (5.7–8.3%) | 7.0% (6.2–7.9%) | 5.0% (4.4–5.6%) |
| 7 or more | 19.0% (17.1–21.1%) | 21.0% (19.7–22.3%) | 12.4% (11.6–13.2%) |
| Disability status | | | |
| Profound or severe core activity limitation | 5.4% (4.4–6.6%) | 5.2% (4.6–6.0%) | 3.6% (3.2–4.1%) |
| Other limitation‡ | 27.0% (24.7–29.4%) | 23.7% (22.3–25.1%) | 15.4% (14.5–16.4%) |
| No disability or restrictive long term health condition | 67.6% (65.1–70.0%) | 71.1% (69.6–72.6%) | 80.9% (79.9–82.0%) |

* Derived from Australian Bureau of Statistics 2017–18 National Health Survey data (respondents: 2453 people who smoke daily, 5384 who formerly smoked, and 8319 who have never smoked); proportions weighted at the person level.[17] † Arthritis; asthma; dorsopathies; malignant neoplasms; chronic obstructive pulmonary disease; heart, stroke and vascular disease; kidney disease; mental and behavioural conditions; osteoporosis. ‡ Mild or moderate limitation, or limitation affecting education or employment. ◆

## 5 Postcode-level residential characteristics of Aboriginal and Torres Strait Islander people who smoke daily, formerly smoked, or have never smoked, Australia, based on 2018–19 survey data*

| Characteristic | Weighted proportion (95% confidence interval) | | |
|---|---|---|---|
| | Smoke daily | Formerly smoked | Never smoked |
| Socio-economic status† | | | |
| Quintile 1 (most disadvantaged) | 66.0% (62.5–69.2%) | 45.2% (40.8–49.6%) | 44.1% (40.1–48.1%) |
| Quintile 2 | 17.0% (14.6–19.7%) | 24.0% (20.1–28.5%) | 19.7% (16.6–23.2%) |
| Quintile 3 | 9.6% (7.6–12.1%) | 16.8% (13.3–20.9%) | 17.8% (14.7–21.4%) |
| Quintile 4 | 5.0% (3.5–7.2%) | 9.6% (7.0–13.0%) | 10.3% (7.9–13.3%) |
| Quintile 5 (least disadvantaged) | 2.4% (1.1–4.8%) | 4.4% (2.8–6.9%) | 8.1% (5.5–11.7%) |
| Remoteness‡ | | | |
| Major city | 28.6% (25.5–32.0%) | 43.6% (38.9–48.4%) | 47.3% (43.1–51.6%) |
| Inner regional | 22.8% (20.1–25.7%) | 24.2% (20.7–28.2%) | 22.0% (18.7–25.7%) |
| Outer regional | 23.5% (20.6–26.5%) | 19.4% (16.1–23.2%) | 15.9% (13.4–18.7%) |
| Remote | 8.7% (7.7–10.0%) | 5.2% (4.1–6.4%) | 5.0% (4.2–6.0%) |
| Very remote | 16.4% (14.7–18.1%) | 7.6% (6.4–9.0%) | 9.7% (8.4–11.3%) |

* Derived from Australian Bureau of Statistics Australian Bureau of Statistics 2018–19 National Aboriginal and Torres Strait Islander Health Survey data (respondents: 2808 people who smoke daily, 1529 who formerly smoked, and 1866 who never smoked); proportions weighted at the person level.[18] † Australian Bureau of Statistics 2016 Index of Relative Socioeconomic Advantage and Disadvantage at the Statistical Area 1 level.[19] ‡ Australian Bureau of Statistics 2016 Australian Statistical Geographic Standard for remoteness.[20] ◆

**6 Postcode-level remoteness–socio-economic status (combined category) of Aboriginal and Torres Strait Islander people who smoke daily, formerly smoked, or have never smoked, Australia, based on 2018–19 survey data***

| Remoteness†/socio-economic status‡ | Weighted proportion (95% confidence interval) | | |
|---|---|---|---|
| | Smoke daily | Formerly smoked | Never smoked |
| All respondents | | | |
| Major city | | | |
| Quintile 1 (most disadvantaged) | 12.9% (11.0–15.2%) | 14.2% (11.6–17.4%) | 13.7% (11.0–17.0%) |
| Quintile 2 | 5.6% (4.1–7.5%) | 9.9% (6.8–14.0%) | 7.0% (5.0–9.6%) |
| Quintiles 3–5 (least disadvantaged) | 10.1% (7.7–13.2%) | 19.5% (15.6–24.2%) | 26.6% (22.7–31.0%) |
| Inner and outer regional | | | |
| Quintile 1 (most disadvantaged) | 32.6% (29.6–35.8%) | 22.2% (18.8–26.0%) | 18.7% (15.9–21.9%) |
| Quintile 2 | 8.4% (6.6–10.6%) | 11.9% (9.3–15.2%) | 11.5% (9.0–14.4%) |
| Quintiles 3–5 (least disadvantaged) | 5.2% (3.8–7.1%) | 9.5% (7.3–12.4%) | 7.7% (5.8–10.2%) |
| Remote and very remote | | | |
| Quintile 1 (most disadvantaged) | 20.4% (18.5–22.4%) | 8.7% (7.5–10.2%) | 11.6% (10.1–13.3%) |
| Quintile 2 | 3.0% (2.4–3.7%) | 2.3% (1.5–3.3%) | 1.2% (0.9–1.7%) |
| Quintiles 3–5 (least disadvantaged) | 1.7% (1.3–2.3%) | 1.7% (1.3–2.4%) | 1.9% (1.4–2.6%) |

* Derived from Australian Bureau of Statistics Australian Bureau of Statistics 2018–19 National Aboriginal and Torres Strait Islander Health Survey data (respondents: 2808 people who smoke daily, 1529 who formerly smoked, and 1866 who have never smoked); proportions weighted at the person level.[18] † Australian Bureau of Statistics 2016 Australian Statistical Geographic Standard for remoteness.[20] ‡ Australian Bureau of Statistics 2016 Index of Relative Socioeconomic Advantage and Disadvantage (Statistical Area 1).[19] ◆

**7 Estimated numbers and proportions of Aboriginal and Torres Strait Islander people aged 18 years or older who smoke daily, formerly smoked, or have never smoked, Australia, based on 2017–18 and 2018–19 survey data***

| Population | Smoke daily | Formerly smoked | Never smoked |
|---|---|---|---|
| All people (NHS, 2017–18) | 2 567 000 | 5 440 800 | 10 388 100 |
| Aboriginal or Torres Strait Islander people (NATSIHS, 2018–19) | 195 700 (8%) | 116 700 (2%) | 159 000 (2%) |
| Non-Indigenous people (derived)† | 2 371 300 (92%) | 5 324 100 (98%) | 10 229 100 (98%) |

* Sources: Derived from Australian Bureau of Statistics 2017–18 National Health Survey (NHS)[30] and 2018–19 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) data;[31] proportions based on NHS, 2017–18 population estimates. † Derived by deduction of Aboriginal or Torres Strait Islander population estimate from the total population estimate. ◆

generally largest for people who had formerly smoked, probably for a combination of reasons, including their higher median age, the health effects of their earlier smoking, and the increased likelihood of smoking cessation after a medical diagnosis ("sick quitter effect").

Aboriginal and Torres Strait Islander people comprised an estimated 8% of Australians who smoked daily in 2018–19 (195 700 people). About two-thirds of Indigenous respondents who smoked daily in 2018–19 lived in areas in the most disadvantaged socio-economic quintile at all three remoteness levels. Exposure to factors associated with smoking, including social disadvantage, is particularly high among Indigenous peoples, reflecting the historical and ongoing consequences of colonisation, such as exclusion from the economy and from health and education systems.[22,23] This underpins the higher prevalence of smoking among Aboriginal and Torres Strait Islander people than non-Indigenous Australians. Multi-sector interventions are needed to comprehensively overcome the structural drivers of disadvantage.[24,25]

Earlier studies, which have been comparative, found that younger people and men were more likely to smoke than other people.[9,26] In our study, we found that 36.8% of people who smoked daily were men aged 25–54 years (Box 3). The proportion born overseas was smaller among people who smoked than for people who had never smoked, but the survey data were insufficient for estimating region- or country-specific proportions. The prevalence of smoking among migrants is influenced by smoking behaviours in their countries of origin, and also by their generally being younger, more financially secure, and healthier than people who do not emigrate.[27] More than 60% of respondents born overseas who smoked daily were men, a predominance consistent with other reports.[28] Compared with people who smoked daily, larger proportions of respondents who no longer or had never smoked were employed, had tertiary degrees, and reported good to excellent health and low to moderate psychological distress, suggesting complex interactions between social disadvantage and the health impact of smoking.

The higher prevalence of daily smoking in certain population groups indicates health and broader system failings and that comprehensive, multifaceted, systems-based approaches to tobacco control are needed. Understanding the interactions of factors that contribute to smoking is critical for protecting health, including that of people who smoke. Numerous policy

and legislative options are outlined in the WHO Framework Convention on Tobacco Control, including structural changes and regulations, as well as intensifying measures such as tobacco taxation, media campaigns, tobacco advertising bans, restricting tobacco retail licensing and reducing the number of retail outlets, and expanding smoke-free areas.[5] Acknowledging the multifaceted role of tobacco companies in the problem shifts the focus from individual blame, responsibility, and stigmatisation of people who smoke to the tobacco industry itself. Changing the socio-cultural, political, economic, health and regulatory systems in which tobacco companies promote and sell their products will encourage individual and community agency and support freedom from nicotine dependence.

Whole of population approaches[4,25] should be accompanied by targeted programs and policies. This includes specific interventions for Aboriginal and Torres Strait Islander people, and groups that include the majority of people who smoke daily, such as men, people aged 25–54 years, and those living in areas of greatest socio-economic disadvantage. Our findings also support applying intersectionality to investigating complex relationships to better understand disparities.[14] Knowing that most people who smoke regularly are employed, educated, and mentally healthy can inform decisions about who should be targeted. Effective campaigns are those in which people recognise themselves and their social norms, so that they feel at risk and are motivated to action.[12] Approaches based on stereotypes and stigmatisation are unethical and reduce self-efficacy and capacity for appropriate action in their intended audiences.[15] Combining comparative and absolute perspectives is needed to inform a comprehensive approach to reducing tobacco use and supporting people to quit smoking or to avoid taking it up.

## Limitations

We report the first detailed analysis of the characteristics of people who smoke daily, formerly smoked, or never smoked in Australia, based upon nationally representative data. The response rate for the two ABS surveys was high (76.0%),[29] but their home interview sampling strategy may have biased their samples in favour of people more likely to be home because of their employment situation. Although the validity of self-reported smoking status has been reported to be excellent,[32] survey responses may not accurately reflect actual behaviour. Estimates for Indigenous people were derived from two sets with data collected about twelve months apart; as using multiple data sources affects estimate accuracy, the figures in Box 7 are reported without decimal places or confidence intervals to avoid inappropriately implied precision. However, sensitivity analyses indicated that our major findings were robust to variations in assumptions regarding changes in population size and the prevalence of smoking between the two surveys (Supporting Information, table 6). Changes in smoking prevalence and increasing use of other nicotine products, such as e-cigarettes, means that population profiles should be regularly reviewed.

## Conclusion

People who smoke regularly in Australia have much in common with the general population. However, there are also important priority groups for tobacco control. Understanding who smokes is needed to inform both whole of population and targeted programs and policies for reducing tobacco use and nicotine dependence. Further, comprehensive structural supply- and demand-based tobacco control is required to reduce smoking prevalence among adults to the current targets of 5% or less for all Australians and 27% or less for Aboriginal or Torres Strait Islander people. Reforming the health and broader systems in which tobacco companies promote and sell their products can improve individual and community agency to be free from nicotine dependence, and ultimately eliminate tobacco-related death and disease.

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## Supporting Information

Additional Supporting Information is included with the online version of this article.