

Trends in tobacco and e-cigarette use, 2015–2022

Findings from the
ACT General
Health Survey

October 2023





Acknowledgement of Country

ACT Health acknowledges the Ngunnawal people as traditional custodians of the land and recognise any other people or families with connection to the lands of the ACT and region. We wish to acknowledge and respect their continuing culture and the contribution they make to the life of this city and this region.

The ACT Health Directorate would also like to thank the many Canberrans who have participated in the ACT General Health Survey.

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Executive summary

Tobacco smoking is the single most important preventable cause of ill health and death in Australia [1]. E-cigarettes are products that deliver nicotine and/or other chemicals via an aerosol that is inhaled into the lungs. There is evidence that e-cigarettes are harmful to health [2]. In addition, there are concerns that e-cigarette use (vaping) can lead to nicotine addiction and serve as a “gateway” to tobacco cigarette smoking [3, 4].

The analyses for this report are based on a multi-year dataset comprising 7,976 participants aged 18 years and over who took part in the ACT General Health Survey between 2015 and 2022. Respondents were asked to self-report their tobacco and e-cigarette use.

Results are presented under section 3 of this report.

Key findings include:

- Tobacco use generally remained stable between 2015 and 2022. However, there has been an upward trend in the proportion of younger adults who have ever smoked during that period.
- E-cigarette use is increasing over time, particularly among younger adults and females.
- E-cigarette use has the highest odds for predicting current smoking status, with daily/occasional and ex-vapers having 4 and 6 times the odds of being a current smoker in 2022 compared with those who've never used e-cigarettes, respectively.
- In 2022, respondents with university or post-graduate education have lower odds of being current smokers than respondents with school as their highest qualification.
- Respondents who report receiving a government benefit in 2022 have marginally increased odds of being a current smoker compared to those who did not report receiving a government pension, allowance or benefit.

ACT General Health Survey statistics are updated annually on the HealthStats ACT website (<https://health.act.gov.au/about-our-health-system/data-and-publications/healthstats>). While all efforts have been made to ensure accuracy of data presented in this report, any updates made to the ACT General Health Survey data following publication are available on the HealthStats ACT website.

1. Introduction

The ACT General Health Survey is an annual survey which commenced in 2007 to monitor health related trends in the ACT. It is conducted by Computer Assisted Telephone Interview with randomly selected ACT residents. The ACT General Health Survey collects data for a variety of topics that influence health and wellbeing including:

- Self-rated health and disability
- Wellbeing
- Mental health conditions and psychological distress
- Tobacco and e-cigarette use
- Nutrition
- Alcohol consumption
- Physical activity and sedentary behaviour
- Height and weight
- Oral health.

This report looks at trends in self-reported tobacco and e-cigarette use of 7,976 adults aged 18 years and over who took part in the ACT General Health Survey between 2015 and 2022. The ongoing collection of tobacco and e-cigarette use data is important because:

- Tobacco is the single most important preventable cause of ill health and death in Australia [1]. Tobacco use is the single risk factor shared by 4 of the main categories of chronic disease including cardiovascular disease, cancer, chronic lung disease and diabetes [5].
- There is evidence that e-cigarettes are harmful to health and may serve as a “gateway” to tobacco smoking [2]. There have been many studies which found experimentation with e-cigarettes encouraged the use of tobacco cigarettes, particularly among young people [3, 4]. Research of e-liquids available to purchase over the counter in Australia found that 1 in 5 contain nicotine, among other toxic chemicals [6].

2. Method

The ACT General Health Survey is conducted using Computer Assisted Telephone Interviewing. In 2015 and 2016, the survey sample frame predominantly consisted of randomly-generated landline telephone numbers. The ACT General Health Survey was not conducted in 2017 while the survey program was being reviewed. In 2018, due to the continuing decline of landline usage among households, the proportion of mobile sample was increased from around 9% in 2016 to 70%. The e-cigarette measures were not included in the 2019 questionnaire. From 2020, the mobile sample was increased to 100%.

Respondents were asked to self-report their tobacco and e-cigarette use, selecting from:

- Daily
- Occasionally
- Used to smoke/vape
- Tried it (but never smoked/vaped regularly)
- Never

Daily and occasional use were combined for reporting. Ever smoked/vaped categories include respondents who reported that they smoke/vape daily, occasionally, used to smoke/vape or have tried smoking/vaping. Don't know and refused responses were excluded from analysis.

Estimates were weighted to adjust for differences in the probability of selection among respondents and were benchmarked to the Estimated Resident Population using the latest available Australian Bureau of Statistics population estimates.

Persons includes respondents who identified as male, female, other and those who refused to answer and may not always add to the sum of male and female.

For the purpose of reporting the ACT General Health Survey data in this report, if the 95% confidence intervals of the estimates do not overlap, they are considered to be significantly different. The impact of this conservative method means that estimates that were marginally significantly different may have been classified as not statistically significant.

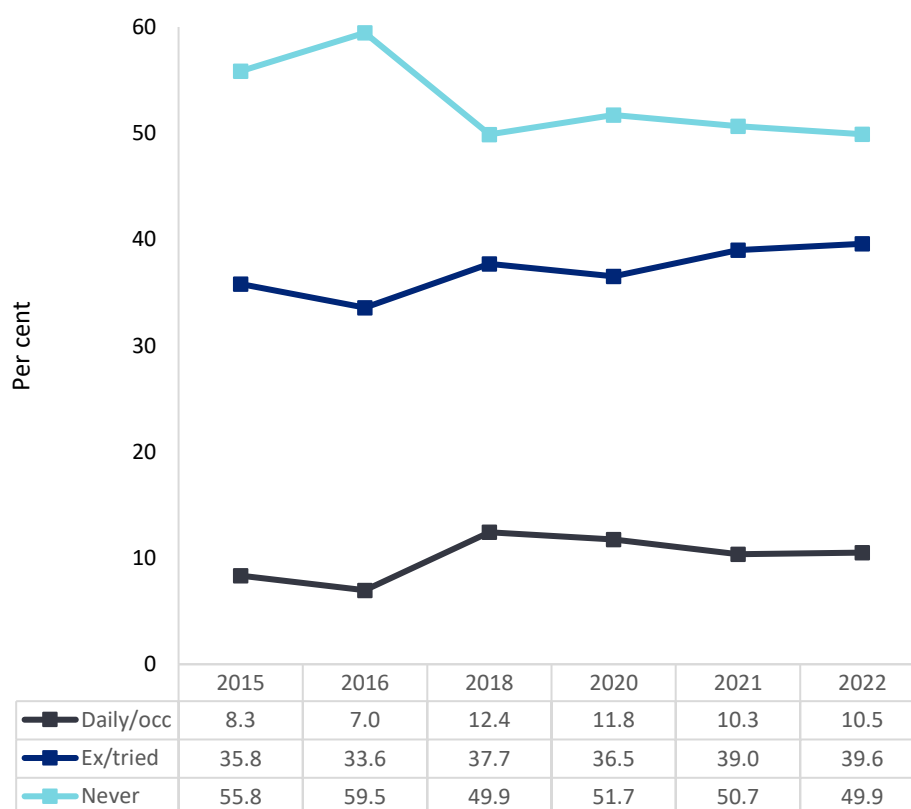
Stata 17 was used to conduct the analysis.

3. Results

3.1 Tobacco use

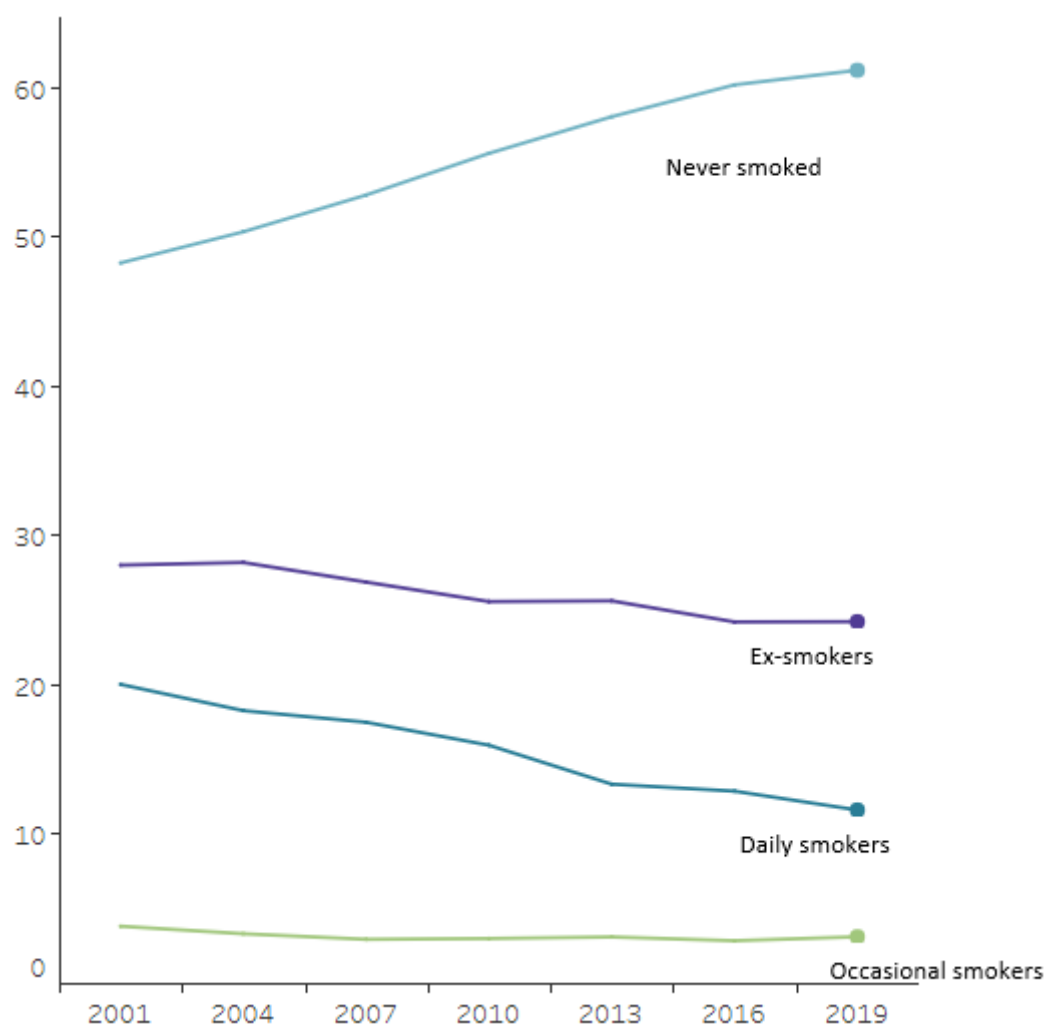
Respondents who reported that they were daily/occasional smokers, ex-smokers and had never smoked remained stable between 2015 and 2022 (**Figure 1**). This trend is similar to the national trend in tobacco use, however daily tobacco use significantly decreased between 2016 and 2019 nationally (**Figure 2**).

Figure 1: Tobacco use, 18 years and over, ACT, 2015–2022



Source: ACT General Health Survey

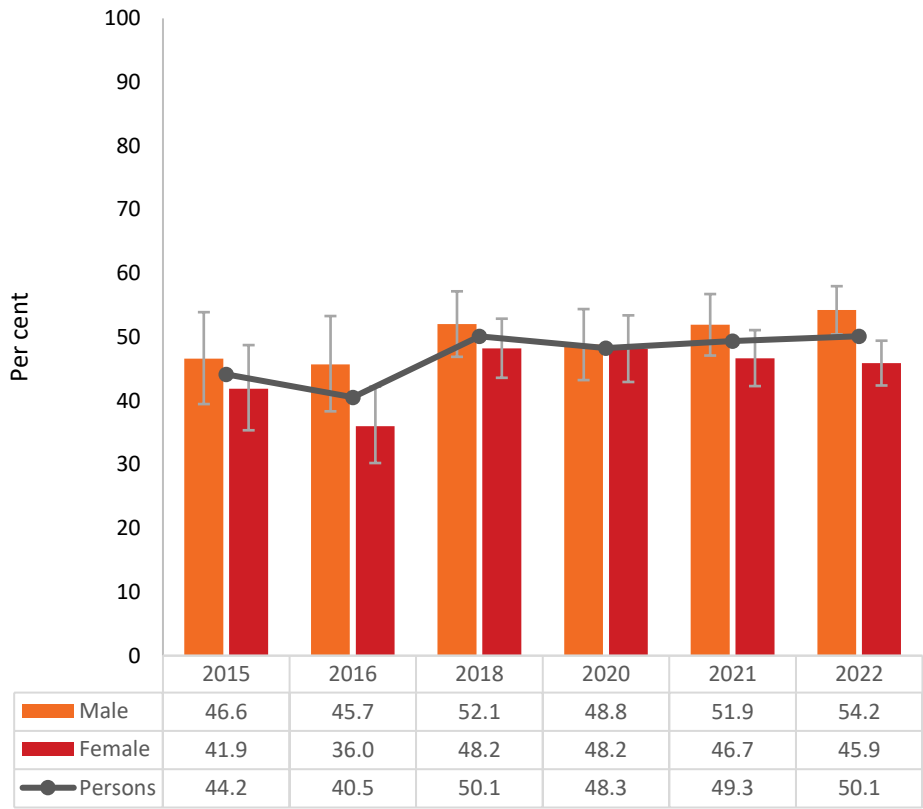
Figure 2: Tobacco use, 18 years and over, Australia, 2011–2019



Source: <https://www.aihw.gov.au/reports/alcohol/alcohol-tobacco-other-drugs-australia/contents/data-by-region/tobacco>

In 2022, males (54.2%) were significantly more likely to report that they have ever smoked than females (45.9%). There was no significant difference between males and females who have ever smoked in any of the other years (**Figure 3**).

Figure 3: Ever smoked, ACT adults, males and females, 2015–2022

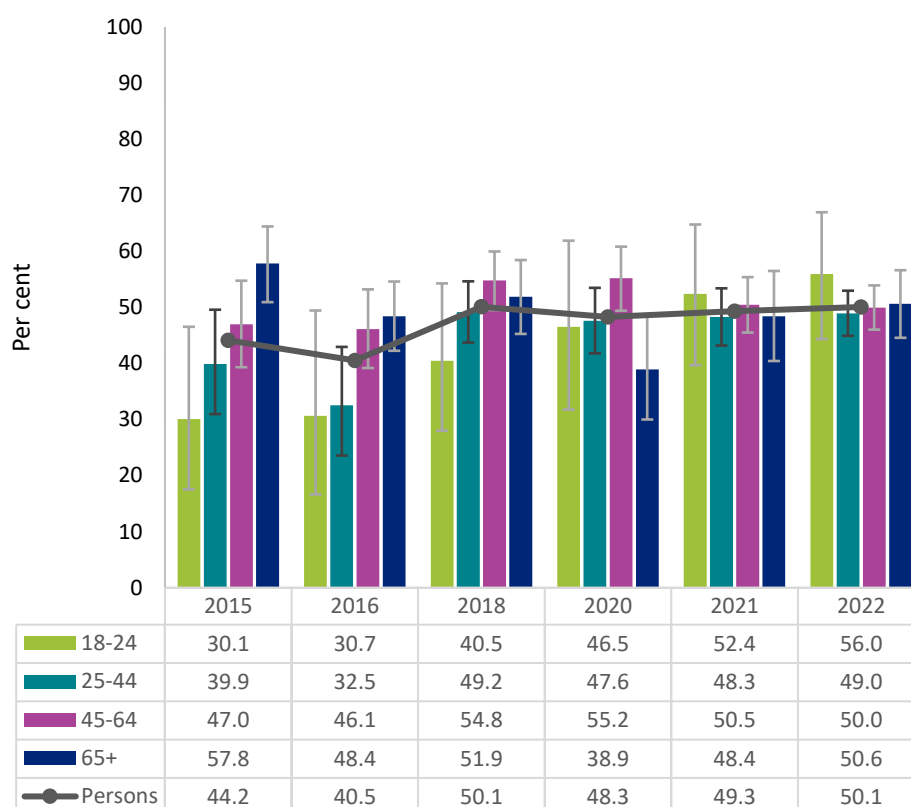


Source: ACT General Health Survey

In 2015, respondents aged 65 years and over were significantly more likely to report that they have ever smoked than respondents aged 18 to 24 years (57.8% vs 30.1%). There was no significant difference between age groups in any of the other years.

While respondents aged 18 to 24 years who have ever smoked increased between 2015 (30.1%) and 2022 (56.0%), this increase was not statistically significant (**Figure 4**).

Figure 4: Ever smoked, ACT adults by age group, 2015–2022



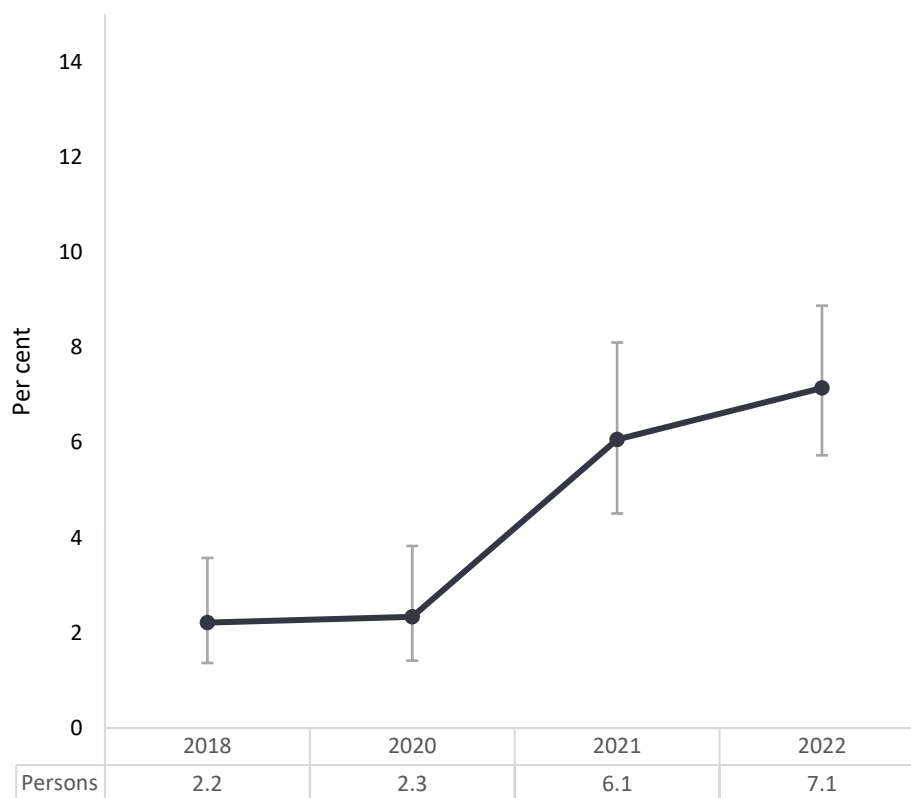
Source: ACT General Health Survey

3.2 E-cigarette use

While the available national data for e-cigarette use is for a different age range and definition of use than the ACT data, they show that like tobacco, there are similarities in trends in e-cigarette use nationally and in the ACT (**Figure 5** and **Figure 6**).

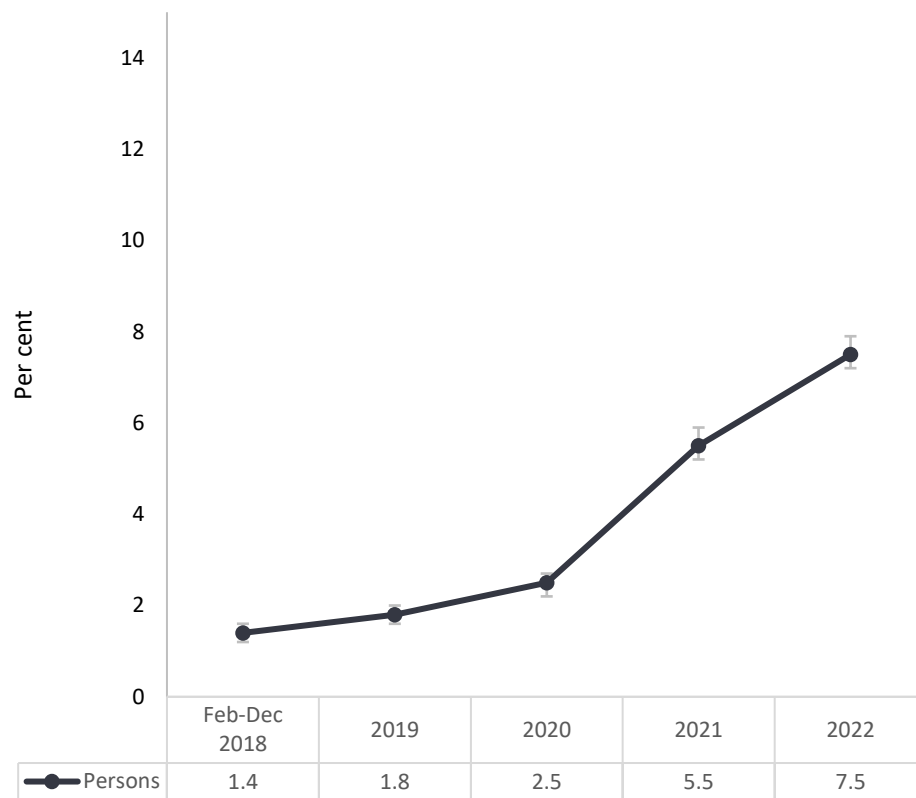
In the ACT, there has been a significant increase in daily/occasional e-cigarette use between 2018 and 2022. It remained stable between 2021 and 2022 (**Figure 5**).

Figure 5: Daily/occasional e-cigarette use, 18 years and over, ACT, 2018–2022



Source: ACT General Health Survey

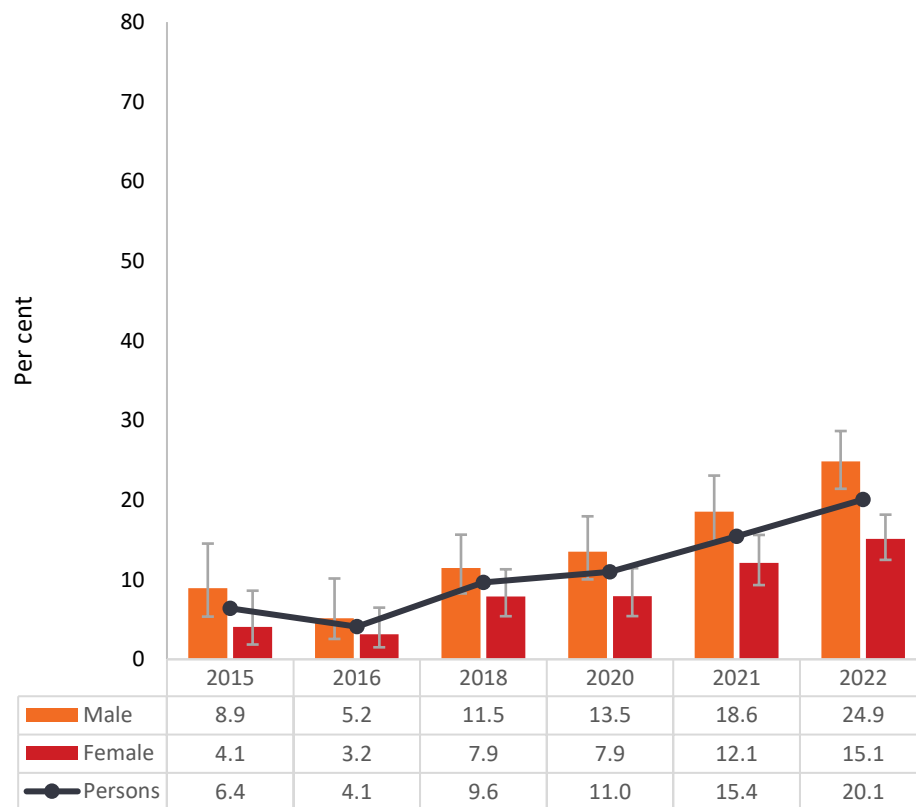
Figure 6: Past month e-cigarette use, 14 years and over, Australia, 2018–2022



Source: <https://www.health.gov.au/sites/default/files/2023-06/current-vaping-and-smoking-in-the-australian-population-aged-14-years-or-older-february-2018-to-march-2023.pdf>

Between 2015 and 2022, there was a 180% increase in the proportion of males who have ever vaped and a 268% increase in the proportion of females who have ever vaped. In 2022, males were significantly more likely to report that they have ever vaped than females (**Figure 7**).

Figure 7: Ever used e-cigarettes, ACT adults, males and females, 2015–2022

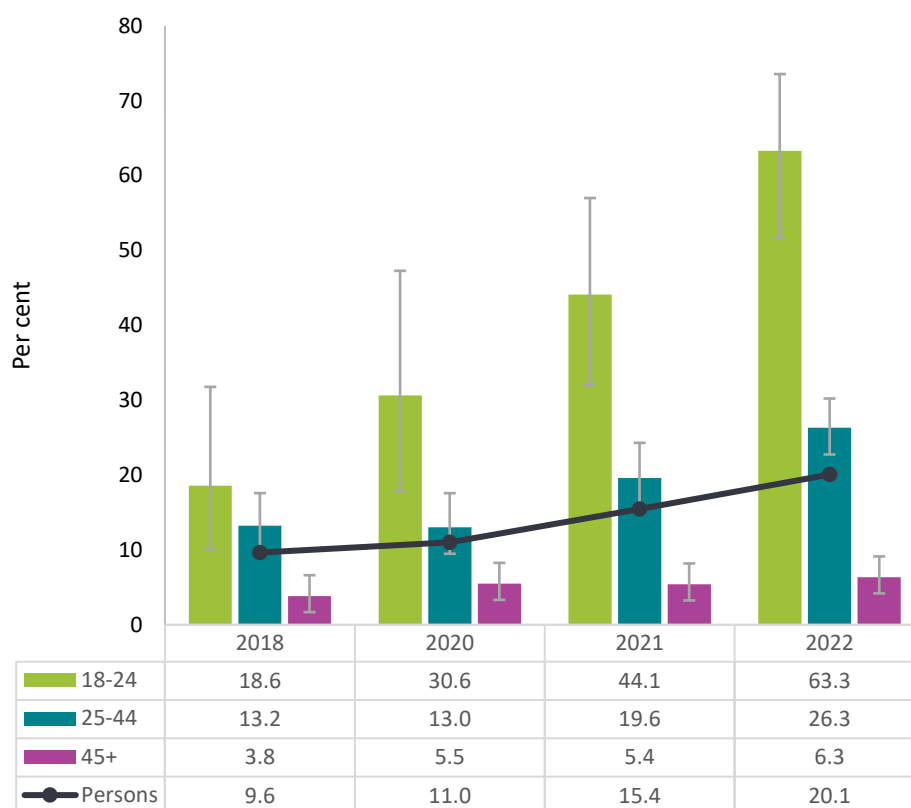


Source: ACT General Health Survey

Respondents aged 18 to 24 years were significantly more likely to report that they have ever vaped than respondents aged 25 to 44 years in 2020, 2021 and 2022. In all years, both the 18 to 24 years and 25 to 44 years age groups were significantly more likely to report that they have ever vaped than respondents aged 45 years and over.

Between 2018 and 2022, there was a 4-fold increase in the proportion of adults aged 18 to 24 years who have ever vaped (**Figure 8**).

Figure 8: Ever used e-cigarettes, ACT adults by age group, 2018–2022



Source: ACT General Health Survey

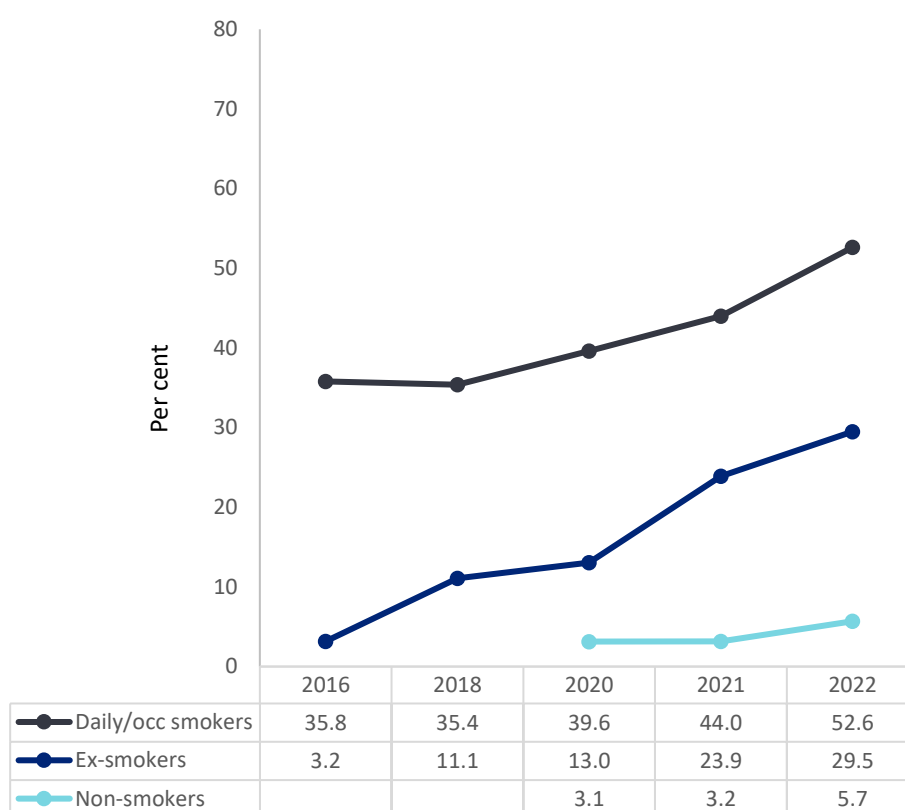
Note: The 2018 and 2020 estimates for adults aged 18 to 24 years have a relative standard error between 25% and 50% and should be used with caution.

3.3 Tobacco and e-cigarette use

E-cigarettes have often been marketed as tools to help smokers to quit smoking. When looking at the smoking status of respondents who have ever vaped, while there was a significant increase in ex-smokers who have ever vaped between 2020 and 2022, daily/occasional smokers were significantly more likely to report that they have ever vaped than ex-smokers and non-smokers (**Figure 9**).

Of the male and female daily/occasional smokers who have ever vaped, while male smokers were slightly more likely to report that they have ever vaped than female smokers, this difference was not statistically significant (**Figure 10**).

Figure 9: Daily/occasional smokers, ex-smokers and non-smokers who have ever vaped, ACT adults, 2016–2022

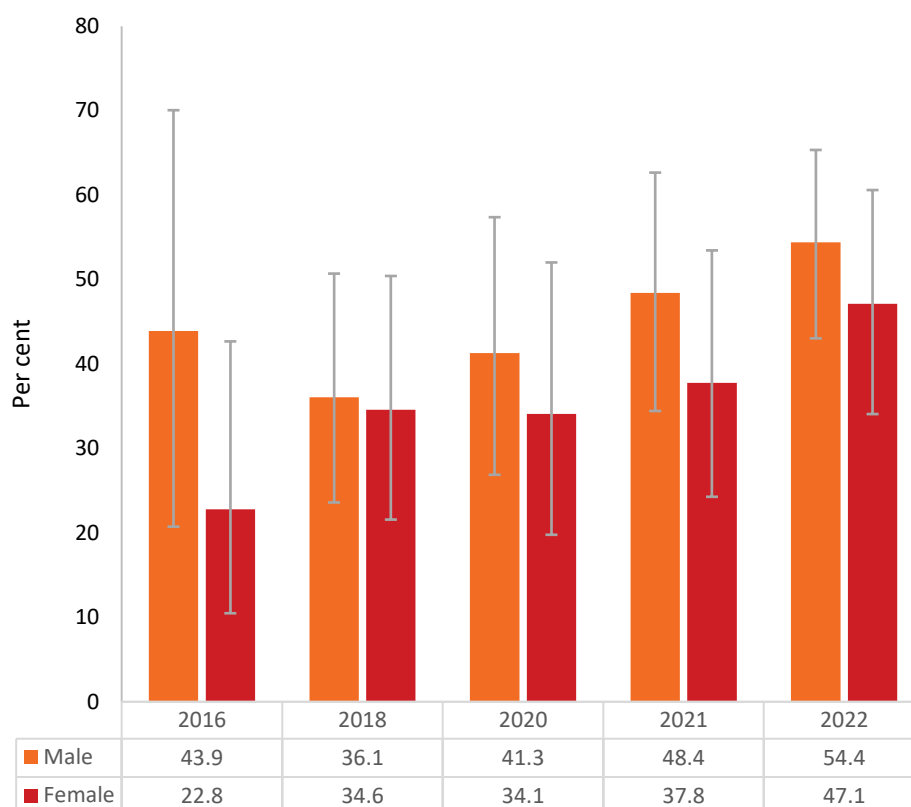


Source: ACT General Health Survey

Notes:

- The 2016 and 2018 estimates for non-smokers have not been published due to small numbers or a relative standard error greater than 50%.
- The 2016 daily/occasional and ex-smokers estimates and the 2020 and 2021 non-smokers estimates have a relative standard error between 25% and 50% and should be used with caution.

Figure 10: Daily/occasional smokers who have ever vaped, ACT adults, males and females, 2016–2022



Source: ACT General Health Survey

Note: The 2016 estimates for males and females have a relative standard error between 25% and 50% and should be used with caution.

3.4 Select social determinants of health of tobacco and e-cigarette users

The social determinants of health are non-medical factors that play a role in health outcomes. Research shows that the social determinants can be more important than health care or lifestyle choices in influencing health [7]. This section looks at two of the social determinants of health for tobacco and e-cigarette users: education and government benefit status.

The following questions were used to assess education and government benefit status:

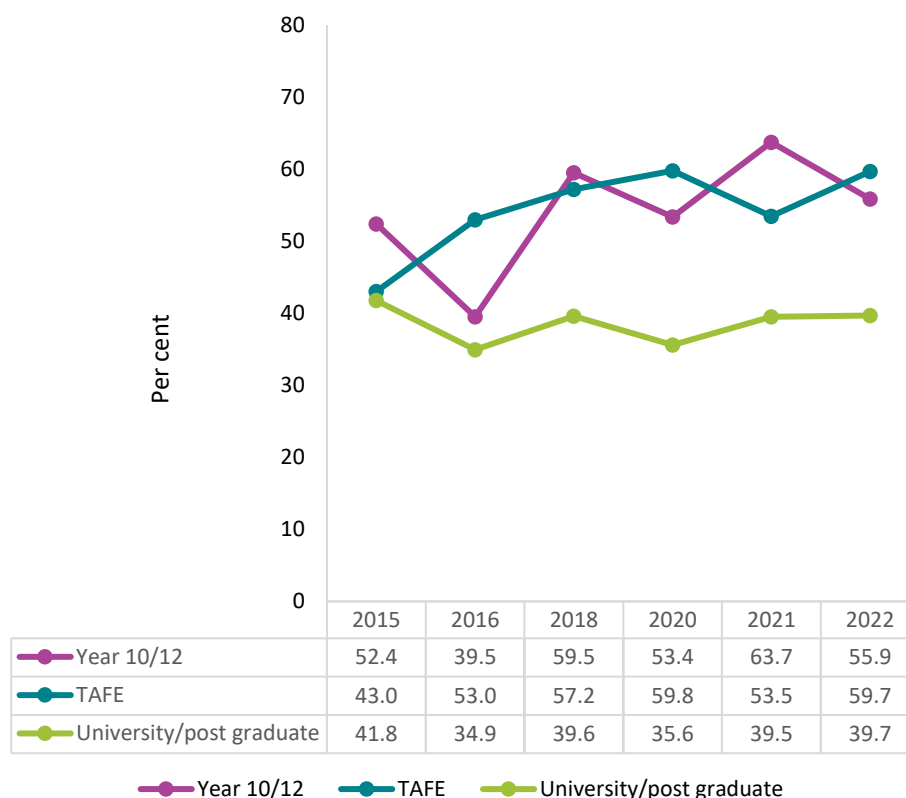
1. What is the highest qualification you have completed?
2. Do you currently receive a government pension, allowance or benefit?

Highest level of education

Between 2015 and 2022, respondents who have ever smoked and whose highest qualification was TAFE significantly increased (43.0% vs 59.7%). In 2022, respondents whose highest qualification was TAFE (59.7%) were significantly more likely to report that they have ever smoked than respondents whose highest qualification was university/post graduate degree (39.7%) (**Figure 11**).

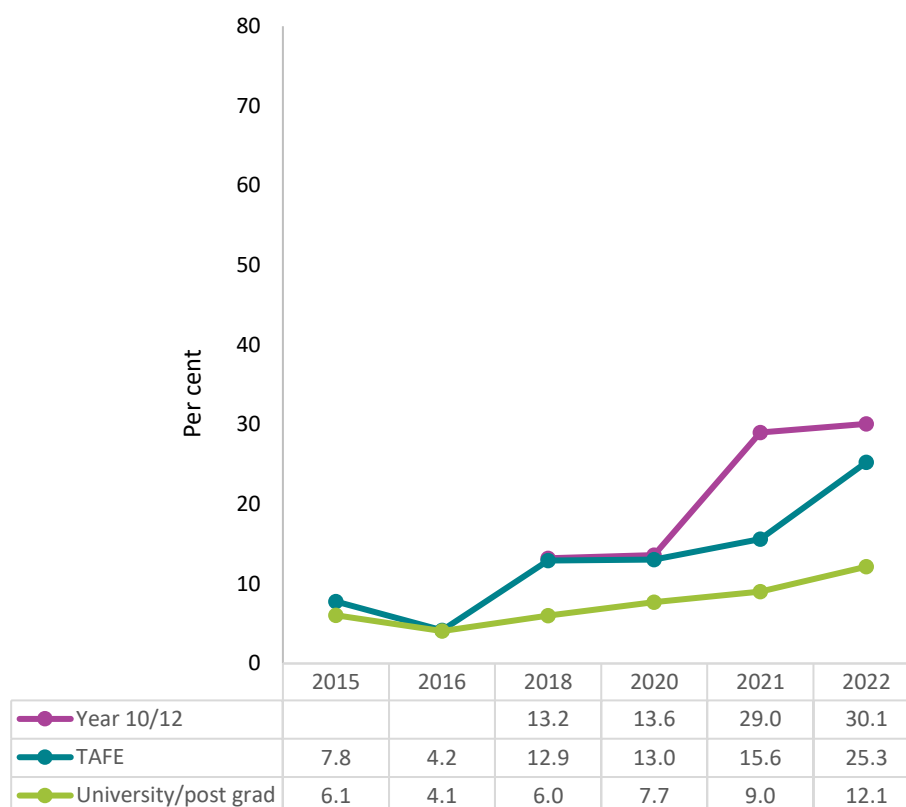
Between 2018 and 2022, there was a 128% increase in the proportion of year 10/12 respondents who have ever vaped, a 96% increase in TAFE respondents who have ever vaped and a 102% increase in university/postgraduate respondents who have ever vaped. In 2022, respondents whose highest qualification was year 10/12 (30.1%) or TAFE (25.3%) were significantly more likely to report ever using e-cigarettes than respondents with a university/postgraduate degree (12.1%) (**Figure 12**).

Figure 11: Highest qualification of ACT adults who have ever smoked, 2015–2022



Source: ACT General Health Survey

Figure 12: Highest qualification of ACT adults who have ever vaped, 2015–2022



Source: ACT General Health Survey

Notes:

- The 2015 and 2016 estimates for Year 10/12 have not been published due to small numbers or a relative standard error greater than 50%.
- The 2018 and 2020 estimates for Year 10/12 and the 2015 and 2016 for TAFE and University/Post graduate degree have a relative standard error between 25% and 50% and should be used with caution.

Government benefit

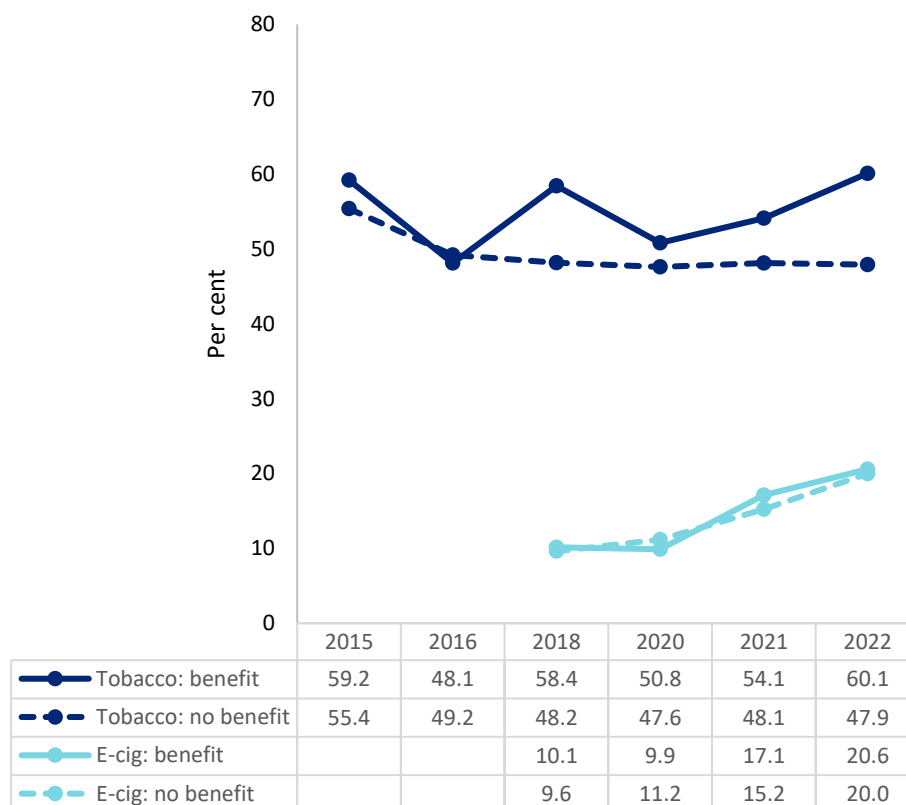
Respondents who reported receiving a government pension, allowance or benefit at the time of the survey were significantly more likely to report that they have ever smoked than ever vaped in all years. The proportion of respondents who have ever smoked and reported receiving a government benefit remained stable between 2015 (59.2%) and 2022 (60.1%).

Although there has been an increase in the proportion of respondents who reported receiving a government benefit and have ever vaped between 2018 and 2022, this increase was not statistically significant (10.1% vs 20.6%).

When looking at respondents who have a government benefit compared to those who don't, respondents with a government benefit were significantly more likely to have ever smoked than respondents without a government benefit in 2022 (60.1% vs 47.9%). There was no significant difference in any of the other years for those with a government benefit compared to those without a government benefit who have ever smoked or vaped (**Figure 13**).

It should be noted that government benefits are wide ranging and so caution should be taken when interpreting this data.

Figure 13: ACT adults with/without a government benefit who have ever smoked or vaped, 2015–2022



Source: ACT General Health Survey

Notes:

- The 2015 and 2016 estimates for e-cigarettes users with and without a government benefit have not been published due to small numbers or a relative standard error greater than 50%.
- The 2018 and 2020 estimates for e-cigarette users with a government benefit have a relative standard error between 25% and 50% and should be used with caution.

3.5 Select social determinants of health associated with current tobacco use

In an earlier section we showed that select social determinants of health were associated with e-cigarette and tobacco smoking. In this section we explore the same factors for the 2022 data to see if they are associated with current smoking status.

In **Table 1**, these social determinants of health characteristics are shown by respondents' current smoking status. Respondents who reported that they smoke daily or occasionally were categorised as a 'current smoker'. Ex-smokers and those who have never smoked were categorised as 'not current smoker'.

The results show that of the current smokers, two-thirds smoke daily. Among the not current smokers, a significant proportion (44.2%) were ex-smokers.

Table 1: Select social determinants of health characteristics by current smoking status, ACT adults, 2022

	Not current smoker	Current smoker	Total	p-value
Characteristics	1,791 (89.5%)	210 (10.5%)	2,001 (100.0%)	
Personal Smoking Status				
I smoke daily	0 (0.0%)	140 (66.7%)	140 (7.0%)	<0.001
I smoke occasionally	0 (0.0%)	70 (33.3%)	70 (3.5%)	
I don't smoke now, but I used to	514 (28.7%)	0 (0.0%)	514 (25.7%)	
I've tried it a few times but never smoked regularly	278 (15.5%)	0 (0.0%)	278 (13.9%)	
I've never smoked	999 (55.8%)	0 (0.0%)	999 (49.9%)	
E-cigarette use				
Never	1,498 (83.8%)	100 (47.4%)	1,598 (79.9%)	<0.001
Ex/tried	179 (10.0%)	79 (37.7%)	258 (12.9%)	
Daily/occ	111 (6.2%)	31 (14.9%)	143 (7.1%)	
Receiving government benefits				
No, not receiving	1,489 (83.2%)	149 (71.1%)	1,638 (82.0%)	<0.001
Yes, receiving benefits	300 (16.8%)	61 (28.9%)	361 (18.0%)	
Highest qualification combined categories				
Year 10/12	257 (14.7%)	48 (25.3%)	305 (15.8%)	<0.001
TAFE	592 (34.0%)	108 (56.3%)	699 (36.2%)	
University/postgraduate	891 (51.2%)	35 (18.4%)	926 (48.0%)	
Adult age groups				
18-24	127 (7.1%)	34 (16.1%)	161 (8.0%)	0.005
25-44	834 (46.6%)	88 (42.0%)	922 (46.1%)	
45+	830 (46.3%)	88 (42.0%)	918 (45.9%)	
Sex				
Female	936 (52.3%)	83 (40.3%)	1,019 (51.1%)	0.010
Male	853 (47.7%)	123 (59.7%)	976 (48.9%)	

Source: ACT General Health Survey
Frequency (Percent%): p-value from Pearson
Statistics computed using the survey weights.
Tests adjusted for the survey design.

In 2022, over 50% of current smokers had ever vaped compared to just over 15% among current non-smokers. This suggests that those who have never tried e-cigarettes are more likely to be non-current smokers than those using e-cigarettes. Similarly, the results showed that proportionately there were more respondents who reported receiving a government pension, allowance or benefit in 2022 among current smokers compared to not current smokers (28.9% and 16.8% respectively). One in 4 of all current smokers' highest qualification was Year 10 or 12 compared to 14.7% of people who were not current smokers. Male and younger aged respondents were slightly overrepresented among current smokers.

The bivariate statistics clearly show that current smokers differ from those who do not currently smoke in age, education, government benefit status, and e-cigarette use. However, the effect of each socio-economic factor once other characteristics are controlled for is not known. For example, the data showed that males and respondents whose highest qualification was TAFE were more likely to be current smokers. It is not known whether males were also more likely to be TAFE qualified and if so, whether once the effect of sex is controlled, the effect of education is minimal. To adjust for the effect of other variables and see whether being a male

increases the likelihood of being a current smoker, data was analysed using a multivariate approach. A logistic regression method was used for this analysis. This is a statistical method used for predicting the probability of a binary outcome (i.e. current smoker versus not current smoker) based on multiple covariates including e-cigarette use, age, highest qualification, government benefit status, and sex. The results from the logistic regression are presented in **Table 2**.

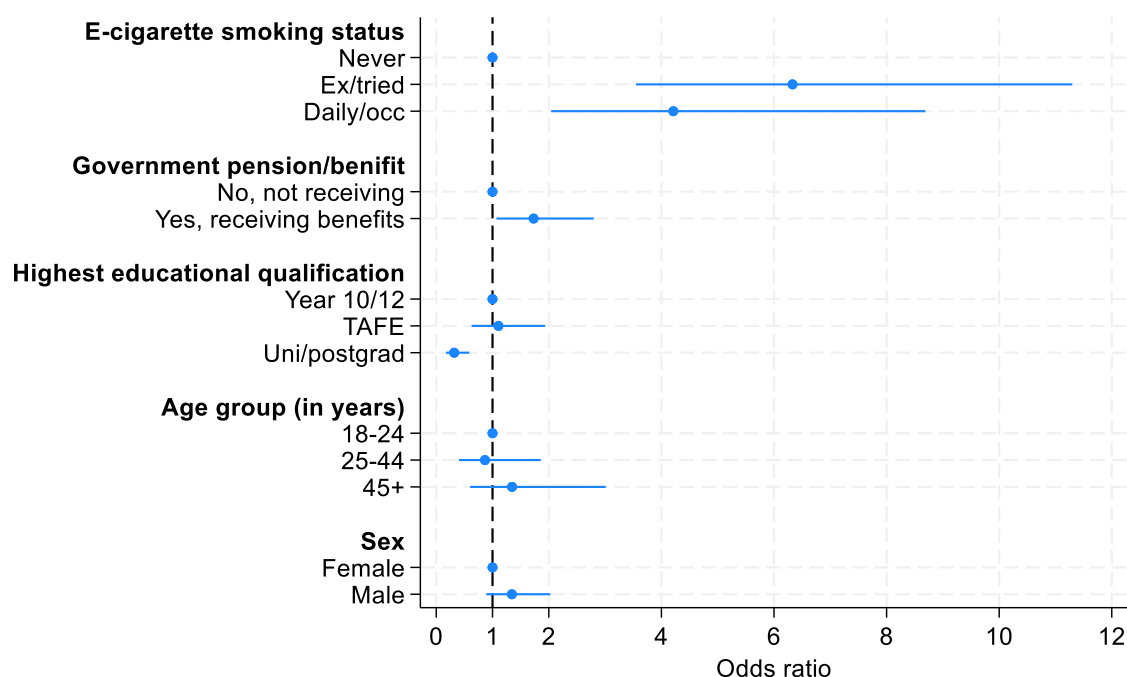
The odds ratio estimates the likelihood of a respondent being a current smoker compared to the base category once the effect of other variables are adjusted for. For example, the odds ratio of someone being a current smoker who has ever vaped is more than 6 compared to those who have never used e-cigarettes, controlling for other variables. Similarly, compared to those who have never vaped, current vapers have over 4 times the odds of being a current smoker. Both odds are significant as seen by t-statistics. The graphical presentation of the estimated likelihood of a respondent being a current smoker by age, sex, highest qualification, government benefit status and e-cigarette status is shown in **Figure 14**.

Table 2: Odds ratio from logistic regression, predicting current smoker, ACT adults, 2022

	Odds ratio	std. err.	t-statistics	[95% conf. interval]
E-cigarette smoking status				
Never (as base)	1.00			
Ex/Tried	6.33	1.87	6.24	[3.55 - 11.3]
Daily/Occasional	4.21	1.56	3.89	[2.04 - 8.69]
Government pension/benefit status				
Not receiving benefit (as base)	1.00			
Yes, receiving benefit	1.73	0.42	2.24	[1.07 - 2.8]
Highest qualification combined categories				
Year 10/12 (as base)	1.00			
TAFE	1.10	0.32	0.35	[0.63 - 1.94]
Uni/postgrad	0.32	0.10	-3.67	[0.17 - 0.59]
Adult age groups				
18-24 (as base)	1.00			
25-44	0.87	0.34	-0.37	[0.4 - 1.86]
45+	1.35	0.55	0.73	[0.6 - 3.01]
Sex				
Female (as base)	1.00			
Male	1.34	0.28	1.41	[0.89 - 2.03]

Source: ACT General Health Survey

Figure 14: Odds ratio and confidence intervals, predicting current smoker status



Source: ACT General Health Survey

Note: An odds ratio of 1 indicates that the exposure (e.g. age) does not affect the outcome while an odds ratio greater than 1 indicates the exposure increases the odds of the outcome and an odds ratio less than 1 decreases the odds of the outcome. The 95% confidence intervals indicate the precision of the odds ratio (wide = less precise; narrow = more precise) [8].

The multivariate analysis predicting the odds of being a current smoker shows that once the effects of other covariates are adjusted, sex and age have no effect. Post-graduate education has a protective effect against being a current smoker while respondents receiving a government benefit have marginally increased odds compared to those not receiving a government benefit of being a current smoker. Of the covariates used in the model, e-cigarette use has the highest odds for predicting current smoking status, with daily/occasional and ex-vapers having 4 and 6 times the odds of being a current smoker, respectively. Although association does not mean causation, the increased likelihood of being a current smoker among ever vapers provides some evidence of the “gateway hypothesis” that people who start using e-cigarettes are more likely to transition to tobacco products than people who do not try e-cigarettes. If surveys can collect information on respondents age of initiation of vaping and smoking, then it would be possible to test the “gateway hypothesis” in more detail.

4. Conclusion

Self-reported data shows that tobacco use remained stable between 2015 and 2022 but e-cigarette use is increasing over time, particularly for younger adults and females.

While e-cigarettes may be used to reduce or quit smoking tobacco cigarettes [9], available evidence shows that younger people who use e-cigarettes may go on to use tobacco products such as cigarettes [3, 4]. Multivariate analysis of cigarette smoking status in 2022 showed that after controlling for the effect of other sociodemographic characteristics, past e-cigarette use has the largest effect on current smoking status.

The Minister for Health and Aged Care recently announced additional funding to strengthen actions to reduce smoking and vaping, including stronger regulation and enforcement of all e-cigarettes [10].

The continued monitoring of tobacco and e-cigarette use will help inform the impact of these measures.

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Appendix 1

Table 3 shows the adult profile of the sample by year. Data shown here are unweighted and are not prevalence estimates. The larger mobile sample introduced from 2018 has resulted in some variance in the sample profile over the reported years. For example, there was a slight increase in respondents who speak a language other than English at home and respondents aged 25 to 44 years while there was a slight decrease in respondents aged 65 years and over and respondents with a government pension, allowance or benefit.

Table 3: Adult respondent profile by year, ACT General Health Survey, 2015-2022 (unweighted)

	2015 n=1,196	2016 n=1,191	2018 n=1,195	2020 n=1,198	2021 n=1,194	2022 n=2,002
Sex						
Male	43.5	39.6	46.0	45.8	44.5	45.6
Female	56.5	60.5	54.0	53.6	55.2	54.1
Other ^(a)	NA	NA	NA	NP	NP	NP
Age						
18-24	4.4	4.1	4.6	4.4	5.6	3.8
25-44	12.0	12.2	32.1	40.5	40.4	38.7
45-64	37.4	34.3	37.3	39.4	38.3	37.9
65+	46.2	49.5	25.9	15.7	15.8	19.6
Born in Australia						
Yes	75.2	73.3	74.1	74.9	72.8	72.2
Language other than English						
Yes	8.4	10.8	14.3	13.8	15.9	16.7
Aboriginal and/or Torres Strait Islander						
Yes	NP	1.1	1.5	2.5	2.3	1.7
Highest qualification						
Year 10/12	20.4	20.2	16.7	13.6	13.9	16.3
TAFE/Diploma	25.0	26.0	26.5	24.4	27.5	40.1
University/post graduate degree	50.8	49.6	54.7	61.3	57.6	77.1
Government benefit						
Yes	59.9	58.8	22.5	18.1	18.1	17.4

(a) Includes other, non-binary and those who refused to answer.

NA: not available

NP: not published.