Prevalence, patterns of use, and socio-demographic features of e-cigarette use by Australian adolescents: a survey

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Adolescent e-cigarette use (vaping) and its harms are public health concerns.[1] A national survey in 2019 found that 10% of 14–17-year-old Australians had used e-cigarettes.[2] More recent studies, smaller or non-representative, have suggested that the rate is rapidly increasing.[3,4] Little is known about how e-cigarette use varies by socio-demographic factors, such as gender, socio-economic status, and residential remoteness.

We assessed the prevalence and patterns of e-cigarette use, and socio-demographic features of Australian adolescents who participated in the 36-month post-baseline assessment of the Health4Life cluster randomised controlled trial.[5] During 1 July – 31 December 2022, 4445 students aged 14–17 years from 70 schools in New South Wales, Queensland, and Western Australia (67% of 6640 baseline participants) were invited to complete an online survey on e-cigarette use as part of the Health4Life assessment. We estimated the proportions of participants who reported using e-cigarettes ever, during the past twelve months, during the preceding 30 days, and regularly (past 30 days and at least weekly); the prevalence of use during the past twelve months and of current regular use was also estimated by gender, remoteness, and relative socio-economic status

1 Socio-demographic characteristics of the 4204 students aged 14–17 years who provided full responses to the e-cigarette survey in the Health4Life 36-month post-baseline assessment

Characteristic	Students	Proportion (95% CI)
Age (years), mean (SD)	15.7 (0.6)	—
Gender		
Girls	2034	48.5% (47.0–50.0%)
Boys	1976	47.1% (45.6–48.6%)
Non-binary	114	2.7% (2.3–3.3%)
Prefer not to say	71	1.7% (1.3–2.1%)
Missing data	9	—
State		
New South Wales (37 schools)	2263	53.8% (52.3–55.3%)
Queensland (18 schools)	1163	27.7% (26.3–29.0%)
Western Australia (16 schools)	778	18.5% (17.4–19.7%)
School type		
Independent (37 schools)	2188	52.0% (50.5–53.6%)
Catholic (10 schools)	775	18.4% (17.3–19.6%)
Government (24 schools)	1241	29.5% (28.2–30.9%)
Socio-economic status*		
Lower (< 0.20)	720	17.8% (16.6–19.0%)
Middle (0.20–0.79)	2802	69.2% (67.8–70.6%)
Upper (0.80–1.0)	526	13.0% (12.0–14.1%)
Missing data	156	—
Remoteness†		
Inner or outer regional	363	8.6% (7.8–9.5%)
Major city	3841	91.4% (90.5–92.2%)

CI = confidence interval; SD = standard deviation. * Family Affluence Scale III scores (based on family owning a car, the adolescent having their own bedroom, and frequency of away-from-home vacations in preceding year[6]) were converted to ridit scores to compare socio-economic status with other students in the study. † Australian Statistical Geography Standard.[7]

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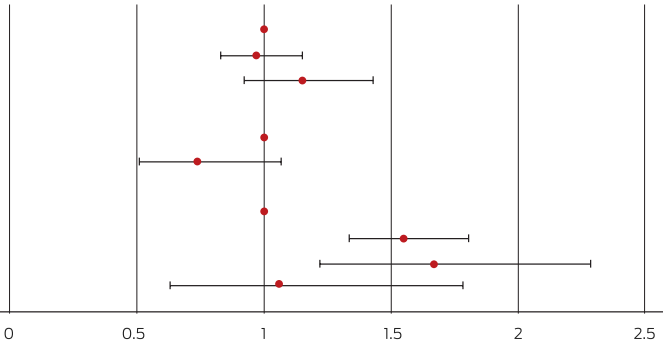
2 E-cigarette use during the past twelve months and current regular e-cigarette use among 14–17-year-old students who participated in the Health4Life 36-month post-baseline survey, by socio-demographic characteristics

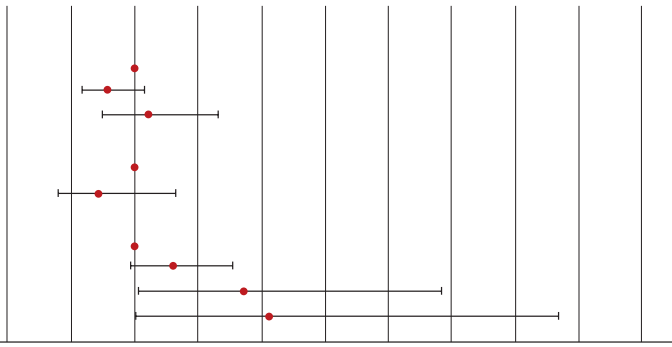
A. Past 12-month e-cigarette use

Participants	Number*	Prevalence (95% CI)	Prevalence ratio (95% CI)
Used in past twelve months	858/4204	20.4% (19.2–21.7%)	
Socio-economic status†			
Lower	143/720	19.9% (17.1–22.9%)	1
Middle	564/2804	20.1% (18.7–21.6%)	0.98 (0.83–1.15)
Upper	121/526	23.0% (19.6–26.8%)	1.15 (0.92–1.43)
Remoteness‡			
Inner or outer regional	89/363	24.5% (20.4–29.2%)	1
Major city	770/3843	20.0% (18.8–21.3%)	0.74 (0.51–1.07)
Gender			
Girls	329/2034	16.2% (14.6–17.8%)	1
Boys	484/1978	24.5% (22.6–26.4%)	1.55 (1.34–1.81)
Non-binary	32/114	28.1% (20.6–36.9%)	1.67 (1.22–2.29)
Prefer not to say	12/71	16.9% (9.9–27%)	1.06 (0.63–1.78)



B. Current regular e-cigarette use

Participants	Number*	Prevalence (95% CI)	Prevalence ratio (95% CI)
Current regular use	240/4204	5.7% (5.1–6.5%)	
Socio-economic status†			
Lower	43/720	6.0% (4.5–7.9%)	1
Middle	145/2802	5.2% (4.4–6.1%)	0.79 (0.58–1.08)
Upper	39/526	7.4% (5.5–10.0%)	1.11 (0.74–1.66)
Remoteness‡			
Inner or outer regional	26/363	7.2% (4.9–10.3%)	1
Major city	214/3841	5.6% (4.9–6.3%)	0.72 (0.40–1.32)
Gender			
Girls	94/2034	4.6% (3.8–5.6%)	1
Boys	126/1976	6.4% (5.4–7.6%)	1.33 (0.99–1.78)
Non-binary	11/114	9.7% (5.5–17%)	1.88 (1.03–3.44)
Prefer not to say	7/71	9.9% (4.9–19%)	2.09 (1.01–4.34)



CI = confidence interval. * Number of respondents who used e-cigarettes during time period/total number of respondents. † Family Affluence Scale III scores (based on family owning a car, the adolescent having their own bedroom, and frequency of away-from-home vacations in preceding year[6]) were converted to ridit scores to compare socio-economic status with other students in the study. ‡ Australian Statistical Geography Standard.[7] ◆

in logistic regression analyses. To overcome the constraints associated with odds ratios for frequently occurring outcomes, we used prevalence ratios (PRs) with 95% confidence intervals (CIs), adjusted for all covariates and school-level clustering. The University of Sydney (2018/882), the University of Queensland (2019000037), and Curtin University (HRE2019-0083) human research ethics committees approved the Health4Life study; the study was also approved under the NSW State Education Research Applications Process (2019006) and by the Catholic Education Diocese of Bathurst, the Catholic Schools Office Diocese of Maitland–Newcastle, Edmund Rice Education Australia, the Brisbane Catholic Education Committee (373), and Catholic Education Western Australia (RP2019/07).

The mean age of the 4204 students who provided full responses to the e-cigarette survey (95% response rate) was 15.7 years (standard deviation [SD], 0.6 years); 2034 were girls (48.5%) (Box 1). A total of 1094 of 4204 respondents reported ever having used e-cigarettes (26.0%; 95% CI, 24.8–27.4%); mean age at first use was 14.0 years (SD, 1.3 years). E-cigarette use in the past twelve months was reported by 858 of 4204 respondents (20.4%; 95% CI, 19.2–21.7%), current use by 423 of 4204 (10.1%; 95% CI, 9.2–11.0%), and current regular use by 240 of 4204 (5.7%; 95% CI, 5.1–6.5%).

The prevalence of use in the past twelve months was higher for boys (PR, 1.55; 95% CI, 1.33–1.80) and non-binary participants (PR, 1.67; 95% CI, 1.22–2.29) than for girls. The prevalence of current regular use was higher for non-binary participants (PR, 1.88; 95% CI, 1.03–3.44) and those who preferred to not report gender (PR, 2.09; 95% CI, 1.01–4.34) than for girls. Socio-economic status and remoteness did not influence prevalence of current use or use in the past twelve months (Box 2).

Although our survey was one of the largest of e-cigarette use by young people in Australia and was not subject to parental influence of responses, our non-probabilistic sample means that extrapolation of our findings to all Australian adolescents should be cautious, especially as it included young people from only three states, and large proportions from independent schools and major cities.

Our findings indicate that strategies for preventing the uptake and reducing the use of e-cigarettes by Australian adolescents are needed. A multilevel approach with components at the individual (eg, primary health care screening and intervention), school (eg. normative education and resistance skills training), and community levels (eg, e-cigarette control policies, media campaigns) would be appropriate.

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