TEN to MEN

The Australian Longitudinal Study on Male Health

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Associations between vaping, mental health and risky health behaviours over time in Australian men

Ten to Men Snapshot Series – #1

Supplementary materials

Supplementary materials

Measures

In this research, data from Waves 1, 3 and 4 of the Ten to Men study were used. Wave 1 data were collected in 2013–14, Wave 3 data were collected from July 2020 to February 2021 and Wave 4 data were collected from August to December 2022. The following section includes details of the specific measures used in this research. Further information on the study design, questionnaires, statistical considerations, data files and other data resources are available via the Ten to Men Data User Guide.

Vaping

In Waves 3 and 4 of Ten to Men, respondents were asked a series of questions relating to their previous and current use of electronic cigarettes (i.e. vapes). In the survey, electronic cigarettes were defined as: 'Electronic cigarettes or e-cigarettes are personal vaporising devices where users inhale vapour rather than smoke. The vapours usually contain flavourings and may contain nicotine as well.'

Ever vaping

Respondents were asked to indicate either 'yes' or 'no' to the question 'Have you ever used an e-cigarette?' For the current analyses, 2 binary indicators (one each for Wave 3 and Wave 4) were generated, coded as 0 = No; and 1 = Yes. A total of 764 respondents indicated that they had ever used an e-cigarette in Wave 3 and had missing data for this question at Wave 4 (i.e. were not asked this question); these cases were coded as '1' (yes) in Wave 4. There were no instances where respondents selected 'yes' to ever vaping at Wave 3 but also selected 'no' to ever vaping at Wave 4.

Current vaping status

Respondents' current vaping was measured with the question, 'How often, if at all, do you currently use e-cigarettes?' Response options included 1 = I used to use them, but no longer use; 2 = Less than monthly; 3 = At least monthly (but not weekly); 4 = At least weekly (but not daily); 5 = Once a day; 6 = 2–5 times a day; 7 = More than 5 times a day. Binary indicators were generated to indicate current vaping status, coded as 0 = not a current user; and 1 = current user. Respondents who selected '1 = I used to use them, but no longer use' or who responded '0 = No' on the ever vaping measure (described above) were coded as '0' (not a current user). Those who selected a response option from '2 = Less than monthly' to '7 = More than 5 times a day' to the question were coded as '1' (current user).

New incidences of vaping

A binary variable to indicate new incidences of vaping was generated for respondents who did not vape in Wave 3 or prior to this but vaped in Wave 4, coded as 0 = No and 1 = Yes. This indicator was created using the current vaping indicator. Respondents were coded as '0 = No' if they were current vapers in Wave 3, if they had missing data for current vaping in Wave 3 and did not currently vape in Wave 4, if they did not vape in Waves 3 or 4 or if they vaped prior to Wave 3. Respondents who did not vape in or prior to Wave 3 but currently vaped in Wave 4 were coded as '1 = Yes' meaning they began vaping between Waves 3 and 4.

Vaping frequency

Categorical indicators of vaping frequency were generated using the newly created ever vaping measure described above and the current vaping question ('How often, if at all, do you currently use e-cigarettes?'). Respondents were coded as 0 = Not a current user, if they responded '0 = No' on the ever vaping question. Using the current vaping question, respondents were coded as 1 = Former user, if they selected '1 = I used to use them, but no longer use'; 2 = Less than monthly, if they selected '2 = Less than monthly'; 3 = Monthly up to 5 times a day, if they selected either '3 = At least monthly (but not weekly)', or '4 = At least weekly (but not daily)', or '5 = Once a day' or '6 = 2–5 times a day'; and 4 = More than 5 times a day, if they

selected '7 = More than 5 times a day.' We also considered vaping frequency specifically for people who were current vapers.

Vaping frequency (at least daily)

Categorical indicators of vaping frequency (at least daily) were generated using the newly created ever vaping measure described above and the current vaping question ('How often, if at all, do you currently use e-cigarettes?'). Respondents were coded as '0 = Not vaping at least daily', if they responded '0 = No' on the ever vaping question or selected '1 = I used to use them, but no longer use', '2 = Less than monthly', '3 = At least monthly (but not weekly)' or '4 = At least weekly (but not daily)' on the current vaping question. They were coded as '1 = Vaping at least daily' if they responded '5 = Once a day', '6 = 2–5 times a day' or '7 = More than 5 times a day' on the current vaping question. We also considered vaping frequency (at least daily) specifically for people who were current vapers.

Nicotine concentration and presence

Respondents who reported that they vaped at least 'less than monthly' (i.e. response options of 2 to 7 for the question 'How often, if at all, do you currently use e-cigarettes?') were asked 'What is the amount of nicotine that you usually use?'. Response options were 1 = 0 mg (nicotine free); 2 = 1–7 mg; 3 = 8–16 mg; 4 = More than 16 mg; -3 = Don't know; -4 = Prefer not to say. Using this measure, for both Wave 3 and 4 data, indicators of nicotine concentration and of nicotine presence were generated.

Nicotine concentration was coded with 5 categories, 0 = Do not vape; 1 = 0 mg (nicotine free); 2 = 1–7 mg; 3 = 8–16 mg; and 4 = More than 16 mg. Respondents were coded as '0 = Do not vape' if they had missing data values of 'not applicable' or 'not asked' and were coded as '0 = Not a current user' for the current vaping indicator. The other 4 categories (from 1 to 4) were coded as per responses to the question 'What is the amount of nicotine that you usually use?'. Respondents with all other missing values, including those who provided responses of 'Don't know' or 'Prefer not to say', were coded as missing. We also considered nicotine concentration specifically for people who were current vapers.

Nicotine presence was coded with 3 categories, 0 = Do not vape; 1 = Nicotine-free; and 2 = Nicotine present. Respondents were coded as '0 = Do not vape' if they had missing data values of 'not applicable' or 'not asked' and were coded as '0 = Not a current user' for the current vaping indicator. Those who responded with '1 = 0 mg (nicotine free)' were coded as '1 = Nicotine-free' and those who responded with either '2 = 1–7 mg', or '3 = 8–16 mg' or '4 = More than 16 mg' were coded as '2 = Nicotine present'. Respondents with all other missing values, including those who provided responses of 'Don't know' or 'Prefer not to say', were coded as missing.

Risky health behaviours

Current cigarette smoking

Binary indicators, one each for Waves 3 and 4, capturing whether males currently smoke tobacco cigarettes were generated using the questions 'Do you currently smoke?' and 'Have you ever smoked even part of a cigarette?' Response options were 'no' and 'yes'. Men were coded as '0 = Not a current smoker' if they indicated that they had never smoked a cigarette or if they responded 'no' to currently smoking. Those who responded 'yes' to the currently smoking question were coded as '1 = Current smoker'.

Risky drinking

In the *Ten to Men* study, alcohol use is measured using the 10-item World Health Organization's Alcohol Use Disorders Identification Test (Babor et al., 2001), which asks about a series of alcohol use behaviours and experiences in the past 12 months. For the current analyses, a Waves 3 and 4 indicator of risky drinking behaviours was generated using the AUDIT question 'How many standard drinks do you have on a typical day when you are drinking alcohol?' Response options included 0 = 1 or 2; 1 = 3 or 4; 2 = 5 or 6; 3 = 7–9; 4 = 10 or more. Men were coded as '2 = Risky drinker' if their response was that of 5 or more standard drinks.

Those who provided a response of up to 4 standard drinks were coded as '1 = Not a risky drinker'. Men who indicated that they had never consumed alcohol in their lifetime, had only had a sip or taste or not drunk alcohol in the past 12 months were coded as '0 = Non-drinker'. These indicators were coded in line with the Australian National Health and Medical Research Council guidelines (National Health and Medical Research Council, 2020) that stipulate that people are at risk of drinking harm when they consume more than 4 standard drinks on any one day.

Illicit drug use

Recent use of illicit drugs was measured with the 'Yes' or 'No' question 'Have you used [name of drug] in the last four weeks?' If respondents were not comfortable with answering, they were instructed to select 'Prefer not to say'. Between Waves 3 and 4 there are some differences in the drugs that were measured (refer to Table S1). For the current analyses, an indicator was generated separately for each of Wave 3 and Wave 4 for any illicit drug use in the past 4 weeks. If respondents selected 'No' for each drug they were coded as '0 = No' and if respondents selected 'Yes' to any drug they were coded as '1 = Yes'.

Table S1: An overview of the illicit drugs measured at Wave 3 and Wave 4 of the *Ten to Men* study

Illicit drugs measured at Wave 3	Illicit drugs measured at Wave 4
Cannabis (i.e. marijuana, pot, grass, weed, joint)	Cannabis (i.e. marijuana, pot, grass, weed, joint)
Ice (i.e. crystal methamphetamine, shard, tina)	Ice (i.e. crystal methamphetamine, shard, tina)
Other meth/amphetamines (e.g. speed, powder meth, whiz, goey)	Other meth/amphetamines (e.g. speed, powder meth, whiz, goey)
Cocaine (i.e. coke, charlie, blow, snow)	Cocaine (i.e. coke, charlie, blow, snow)
Ecstasy (i.e. XTC (online completion only), E, Ex, Eccy, MDMA)	Ecstasy (i.e. XTC, E, Ex, Eccy, MDMA)
GHB (i.e. G, GBH, liquid e, liquid x, juice)	GHB (i.e. G, GBH, liquid e, liquid x, juice)
Hallucinogens (e.g. LSD/acid, magic mushrooms)	Hallucinogens (e.g. LSD/acid, magic mushrooms, DMT)
Heroin (i.e. hammer, smack, H, junk, gear)	Heroin (i.e. hammer, smack, H, junk, gear)
Inhalants (e.g. chroming, sniffing, solvents, glue, petrol, bulbs, poppers)	Inhalants (e.g. chroming, sniffing, solvents, glue, petrol, bulbs, poppers, nangs/nitrous oxide)
Ketamine (i.e. K, special K, ket)	Ketamine (i.e. K, special K, ket)
Synthetic cannabis (designed to mimic cannabis, i.e. spice, kronic, northern lights, blue lotus, K2)	Synthetic cannabis (designed to mimic cannabis, i.e. spice, kronic, northern lights, blue lotus, K2)
Other psychoactive/synthetic drugs (i.e. drugs that have been designed to mimic established illicit drugs, such as party pills, research chemicals)	Other psychoactive/synthetic drugs (i.e. drugs that have been designed to mimic established illicit drugs, such as party pills, research chemicals)
Non-medical use of anabolic steroids (e.g. Deca, Nandrolone, Ostarine, Ligandrol, Nurtabol)	Non-medical use of anabolic steroids (e.g. Deca, Nandrolone, Ostarine, Ligandrol, Nutrobal)
Any other illicit drug (specify)	Pharmaceutical drugs – illicit use (e.g. sleeping pills, stimulants, weight loss, opioids, benzodiazepines)
	Any other illicit drug (specify)

Gambling

In both Waves 3 and 4, respondents were asked to indicate 'How often, on average, did you spend money on the following during the past 12 months?' Types of gambling measured were poker machines, horse racing, sports events, greyhound racing, casino table games, poker, eSports and fantasy sports. Options in the response scale for most types of gambling were 0 = Never; 1 = Once or twice a year; 2 = A few times per year; 3 = Once a month; 4 = 2–3 times a month; 5 = Once a week; 6 = 2–3 times a week; and 7 = 4 or more times a week. Some responses for the fantasy sports question in Wave 4 were confidentialised and

the code frame, which appeared in Stata, was amended to reflect this. Response options for this question were 0 = Never; 1 = Once or twice a year; 2 = A few times a year; 3 = 1–3 times a month; and 4 = One or more times a week.

Binary variables for each type of gambling were generated to indicate whether males participated in each activity less than once a week or once a week or more. Respondents were coded as '0 = Less than once a week' if they provided response options from 0 to 4 for the question on gambling (or 0 to 3 for fantasy sports in Wave 4). Respondents were coded as '1 = Once a week or more' if they provided response options from 5 to 7 for the question on gambling (or 4 for fantasy sports in Wave 4). For the current analyses, overall indicators were generated separately for each of Wave 3 and Wave 4 for *any* gambling at least weekly. If respondents were coded as '0 = Less than once a week' for all activities, they were coded as '0 = Not gambling at least weekly'. If respondents were coded as '1 = Once a week or more' for any of the activities, they were coded as '1 = Gambling at least weekly'.

Problem gambling (for sensitivity analyses)

Gambling in Waves 3 and 4 was also measured for at-risk problem gambling behaviour during the previous 12 months, measured by the Problem Gambling Severity Index (PGSI) described previously (Ferris & Wynne, 2001). Men were asked a series of 9 questions relating to the previous 12 months:

- Have you bet more than you could really afford to lose?
- Have you needed to gamble with larger amounts of money to get the same feeling of excitement?
- When you gambled, did you go back another day to try to win back the money you lost?
- Have you borrowed money or sold anything to get money to gamble?
- Have you felt that you might have a problem with gambling?
- Has gambling caused you any health problems, including stress or anxiety?
- Have people criticised your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?
- Has your gambling caused any financial problems for you or your household?
- Have you felt guilty about the way you gamble or what happens when you gamble?

Response options were '0 = Never', '1 = Sometimes', '2 = Most of the time' and '3 = Almost always'. To calculate the Problem Gambling Severity Index, scores for each item are summed for a total from 0 to 27 and are then categorised as follows:

- Non-problem gamblers – score of 0
- Low-risk gamblers – score of 1 or 2
- Moderate-risk gamblers – score from 3 to 7
- Problem gamblers – score from 8 to 27

For our analyses, we generated a binary variable coded as '0 = Non-problem gambler' for men who were non-problem gamblers and '1 = Low or more risk gambler' for men who were low-risk, moderate-risk or problem gamblers with scores of 1 or more on the Problem Gambling Severity Index. Participants scoring 1+ may be classified as being at some risk of, or already experiencing, gambling-related problems.

Health

Depression

The Patient Health Questionnaire (PHQ)-9, was used to measure respondents' experience and severity of depressive symptoms over the past 2 weeks (Kroenke et al., 2001). Using the response options, 0 = Not at all; 1 = Several days; 2 = More than half the days; and 3 = Nearly every day, respondents were asked 'Over the last 2 weeks, how often have you been bothered by any of the following problems?':

- Feeling down, depressed, irritable, or hopeless
- Little interest or pleasure in doing things

- Trouble falling asleep, staying asleep, or sleeping too much
- Poor appetite, weight loss, or overeating
- Feeling tired, or having little energy
- Feeling bad about yourself – or feeling that you are a failure, or that you have let yourself or your family down
- Trouble concentrating on things, such as reading the newspaper or watching television
- Moving or speaking so slowly that other people could have noticed / Or the opposite – being so fidgety or restless that you were moving around a lot more than usual
- Thoughts that you would be better off dead, or of hurting yourself in some way.

A total depression score was calculated for each respondent by summing their responses to the 9 questions, resulting in a total score ranging from 0 to 27. A 3-category indicator of depression, was then generated separately for each of Waves 3 and 4, coded as '0 = No or minimal depression' for scores from 0 to 4, '1 = Mild depression' for scores from 5 to 9, and '2 = Moderate or severe depression' for scores of 10 or greater.

Anxiety

Generalised Anxiety Disorder (GAD)-7 was used to measure respondent's experience and severity of generalised anxiety symptoms over the last 2 weeks (Spitzer et al., 2006). Using the options, 0 = Not at all; 1 = Somewhat difficult; 2 = Very difficult; and 3 = Extremely difficult, respondents were asked, 'Over the last 2 weeks, how often have you been bothered by the following problems?':

- Feeling nervous, anxious, or on edge
- Not being able to stop or control worrying
- Worrying too much about different things
- Trouble relaxing
- Being so restless that it is hard to sit still
- Becoming easily annoyed or irritable
- Feeling afraid as if something awful might happen

A total anxiety score was calculated for each respondent by summing their responses to the 7 items, resulting in a total score ranging from 0 to 21. An indicator of anxiety with 3 categories was then generated separately for each of Waves 3 and 4, coded as '0 = No or minimal anxiety' for scores from 0 to 4, '1 = Mild anxiety' for scores from 5 to 9 and '2 = Moderate or severe anxiety' for scores of 10 or greater.

Suicidal thoughts

To measure thoughts of suicide, respondents were asked to indicate either 'Yes' or 'No' to the questions (1) 'Have you seriously considered attempting suicide ever in your life?' and (2) 'Have you seriously considered attempting suicide in the past 12 months?' Males were only asked the question relating to the past 12 months if they answered 'Yes' to the first one. Using responses to these 2 questions, binary variables were created. These variables were coded as 0 for 'No suicidal thoughts in the past 12 months' for those who responded 'no' to either question and 1 for 'Suicidal thoughts in the past 12 months' for those who responded 'yes' to the question relating to the past 12 months, separately for Waves 3 and 4. If respondents were not comfortable answering questions about suicide, they were provided with the option to skip forward in the survey.

Suicidal plans

Suicidal plans were also measured with the questions (1) 'Have you ever in your life made a plan about how you would attempt suicide?' and (2) 'During the past 12 months, have you made a plan about how you would attempt suicide?', also with 'Yes' and 'No' response options. Males were only asked the question relating to the past 12 months if they answered 'Yes' to the first one. Using responses to these 2 questions, binary variables were created. These variables were coded as 0 for 'No suicidal plans in the past 12 months'

for those who responded 'no' to either question and 1 for 'Suicidal plans in the past 12 months' for those who responded 'yes' to the question relating to the past 12 months, separately for Waves 3 and 4. If respondents were not comfortable answering questions about suicide, they were provided with the option to skip forward in the survey.

Loneliness

To measure loneliness, respondents were asked a series of questions from the UCLA Loneliness Scale (Russell et al., 1980) in Waves 3 and 4. Using the scale 1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Often; and 5 = Always, respondents were asked 'Currently, how often do you feel that you …'

- lack companionship
- feel left out
- feel isolated from others
- feel lonely?

At Wave 3, the questions were asked for 2 time points, outside of and during the COVID-19 restriction period. At Wave 4, the questions were only asked for one time point. Consistent with Hughes and colleagues (2004), we generated new 3-category variables for the questions relating to lacking companionship, feeling left out and feeling isolated from others, for use in a scale. Those who responded with '1 = Never' or '2 = Rarely' were coded as '1 = Hardly ever', those who responded with '3 = Sometimes' were coded as '2 = Some of the time' and those who responded with '4 = Often' or '5 = Always' were coded as '3 = Often'. Consistent with Hughes and colleagues (2004), we then generated a 3-item loneliness scale, which was the sum of these three 3-category variables (i.e. a score from 3 to 9), provided respondents had no missing data on any of these 3 variables. Consistent with previous recent studies (e.g. Barr-Porter et al. (2024); Mo et al. (2024)), we generated a binary variable, based on the score from 3 to 9. Those with scores from 3 to 5 were coded as '0 = Not lonely' and those with scores from 6 to 9 were coded as '1 = Lonely'.

Disability

Using the Washington Group Short Set of Questions on Disability (Washington Group on Disability Statistics, 2006), respondents were asked to select with 'Yes' or 'No' as to whether they have difficulty:

- seeing, even if wearing glasses
- hearing, even if using a hearing aid
- walking or climbing steps
- remembering or concentrating
- with self-care such as washing all over or dressing
- understanding or being understood while using your usual (customary) language?

For both Waves 3 and 4, an indicator of disability status was generated, coded as '0 = Without disability' for those who responded 'No' to all of the WG-SS questions and '1 = With disability' for those who responded 'Yes' to any of the WG-SS questions.

Demographic

Age

At Wave 3, age was coded into 6 categories: 1 = 16–17; 2 = 18–24; 3 = 25–34; 4 = 35–44; 5 = 45–54 and 6 = 55–63. At Wave 4, there were no respondents aged less than 18 years and age was coded into 5 categories: 1 = 18–24; 2 = 25–34; 3 = 35–44; 4 = 45–54 and 5 = 55–65. For reporting in the snapshot, we also considered Wave 4 age coded into 4 categories: 1 = 18–24; 2 = 25–34; 3 = 35–44 and 4 = 45–65. For the regression analyses described in research questions 2 and 3 (see Data analysis section below), we used age as a continuous covariate.

Region

For both Wave 3 and Wave 4, an indicator of region was generated using the Australian Statistical Geography Standard (ASGS) that defines geographical locations in terms of remoteness, based on the 2016 Census of Population and Housing. Detailed information about the remoteness structure may be sourced from the Australian Bureau of Statistics (ABS) website. For the current analyses, categories were coded as 0 = Major Cities; 1 = Inner Regional and 2 = Outer Regional/Remote/Very Remote.

Employment status

For Wave 3, a 3-category indicator of employment status was generated. Information on employment status was collected from respondents by asking, 'Of the following categories, which best describes your current employment status?' Respondents could select from 1 = Full-time employee; 2 = Part-time employee; 3 = Self-employed; 4 = Employed – unpaid worker in a family business; 5 = Unemployed – seeking employment and 6 = Not employed – not seeking employment. Those who selected either full-time, part-time, self-employed or employed – unpaid worker in a family business were coded as '1 = Employed'. Those who responded with unemployed but were seeking employment were coded as '2 = Unemployed' and those who indicated they were unemployed but not seeking employment were coded as '3 = Not in labour force'.

Education

In Wave 3, information on education was collected from respondents by asking, 'What is the highest year of primary or secondary school you have completed?', with response options of 1 = Year 12 or equivalent; 2 = Year 11 or equivalent; 3 = Year 10 or equivalent; 4 = Year 9 or equivalent; 5 = Year 8 or below; 6 = Never attended school; and 7= Still at school, and 'What is the level of the highest qualification that you have completed?', with response options of 1 = Postgraduate degree; 2 = Graduate diploma/Graduate certificate; 3 = Bachelor degree (with or without honours); 4 = Advanced diploma/diploma; 5 = Certificate III/IV (including trade certificate); 6 = Certificate I/II; and 7 = Other non-school qualification.

A 4-category indicator of education was generated, coded as '1 = Less than Year 12' for males who provided response options from 2 to 7 for the question on highest year of schooling; '2 = Year 12' for males who provided a response option of '1 = Year 12 or equivalent' for the question on highest year of schooling; '3 = Some qualification beyond Year 12' for males who provided response options from 4 to 7 for the question on the highest completed qualification; '4 = University (undergraduate or postgraduate)' for males who provided response options from 1 to 3 for the question on highest completed qualification.

Disadvantage

Disadvantage was measured with Socio-Economic Indexes for Areas (SEIFA), a measure developed by the ABS that ranks geographical areas of Australia according to relative socio-economic advantage and disadvantage. The 2016 SEIFA measure used in the current research is based on information from the Index of Relative Socio-Economic Disadvantage (IRSD). Detailed information about SEIFA may be sourced from the ABS website. For the current analyses a 3-category indicator of disadvantage was generated for each of Wave 3 and Wave 4, separately, using the 2016 SEIFA percentage variable and coded as 1 = High disadvantage (bottom 25%); 2 = Medium disadvantage; and 3 = Low disadvantage (top 25%).

Relationship status

For Wave 3, two indicators of respondent's relationship status were generated, using the measure 'What is your current relationship status?' Response options included 1 = I am single; 2 = I am in a relationship (not living together); 3 = I am living with a partner; 4 = I am engaged; 5 = I am married; 6 = I am divorced; 7 = I am separated; and 8 = I am widowed.

For use in some analyses, relationship status was coded into 3 categories, 1 = Single for respondents who selected single; 2 = In a relationship capturing respondents who indicated that they were either

in a relationship (but not living together), living with a partner, engaged or married; and 3 = Divorced/separated/widowed for those who indicated they were either divorced, separated or widowed. For use in other analyses,[1] relationship status was coded into 2 categories, 1 = No relationship for those who indicated they were single, divorced, separated or widowed; and 2 = In a relationship, for those who indicated that they were either in a relationship (but not living together), living with a partner, engaged or married.

LGBTQA+ status

For both Wave 3 and Wave 4, an indicator of LGBTQA+ status was generated using a combination of measures, one that asked about sexuality and one that asked about current gender identity. In Wave 3, respondents were asked, 'Do you think of yourself as:', with response options of 1 = Heterosexual; 2 = Bisexual; 3 = Homosexual and 5 = Other (specify). They were also asked, 'What is your current gender identity?', with response options of 1 = Male; 2 = Female; 3 = Transgender, male to female; 4 = Transgender, female to male; 5 = Genderqueer/Gender non-conforming and 6 = Other identity (specify).

In Wave 4, respondents were asked, 'How do you describe your sexual orientation?', with response options of 1 = Straight (Heterosexual); 2 = Bisexual; 3 = Gay or lesbian; 4 = Asexual; 5 = I use a different term; 6 = Pansexual; and 7 = Queer. The other measure asked about current gender identity, using the question, 'How do you describe your gender?', with response options including 1 = Man or male; 2 = Woman or female; 3 = Non-binary; and 4 = I use a different term (please specify). People who identified their sexuality as heterosexual and identified as males were coded as '1 = Male-identifying heterosexual'. Those who provided any other response options to the questions on sexuality or gender identity were coded as '0 = Not male-identifying and/or non-heterosexual'.

Indigenous status

In Wave 3, Indigenous status was measured with the question 'Do you identify as Aboriginal, Torres Strait Islander or both?' Response options were: 1 = No; 2 = Aboriginal only; 3 = Torres Strait Islander only; 4 = Both; -3 = Don't know; and -4 = Prefer not to say. A binary variable for whether someone identified as 'Aboriginal or Torres Strait Islander origin' was generated, coded as '1 = Non-Indigenous' for males who responded with 'No' and '2 = Indigenous' for those who responded with 'Aboriginal only', 'Torres Strait Islander only' or 'Both'. Males who provided responses of 'don't know' or 'prefer not to say' were coded as missing.

Culturally and linguistically diverse (CALD) background

Using measures from the Waves 1 and 3 data, a binary indicator of cultural and linguistic diversity among respondents was generated, using the following measures:

- What language do you mainly speak at home?
- In which country were you born?
- In which country was your mother born?
- In which country was your father born?

Respondents were coded as: '1 = Culturally and linguistically diverse background' if their main language spoken at home was anything other than English, if were born outside of Australia or if either their mother or father was born outside of Australia. All other respondents, including those who identified as either Aboriginal or Torres Strait Islander, were coded as '0 = No cultural and linguistically diverse background'.

1 Due to small sample sizes, we collapsed relationship status into 2 categories for research question 3 multivariable analyses.

Data analysis

All statistical analyses were performed using Stata/MP 17.0.

Research question 1

We calculated the prevalence of current vaping and ever vaping, and the frequency of vaping and nicotine concentration for people who currently vape separately for 2020–21 and 2022. We then investigated how the prevalence of current vaping in 2020–21 and 2022 differed by age and specific factors (region, Indigenous status, socio-economic disadvantage, disability status, LGBTQA+ status and whether or not respondents felt lonely (outside of and during the COVID-19 restriction period for 2020–21 and one time point for 2022)). We also calculated the number and population estimate of men who vaped in 2022 but did not previously vape (incidence). Finally, we investigated differences in the incidence variable by age and specific factors (region, First Nations status, socio-economic disadvantage, disability status, LGBTQA+ status and whether or not respondents felt lonely). All results for research question 1 were reported as population-weighted percentages, frequencies or population estimates, except for the number of incident cases, which was unweighted.

Research question 2

We investigated how current e-cigarette use in 2020–21 was associated with later risky behaviours (illicit drug use in the past 4 weeks, gambling at least weekly, current smoking and alcohol consumption (up to 4 and 5 or more standard alcoholic drinks on an occasion, compared to not drinking) in 2022 using multivariable regression analyses. For alcohol consumption we used multinomial logistic regression, and for all other risky behaviours we used Poisson regression, with robust error variances. Separate models were fitted for each risky behaviour. Covariates included in the models were age, region, socio-economic disadvantage, First Nations status, depression in the past 2 weeks, anxiety in the past 2 weeks, employment status, relationship status, education, culturally and linguistically diverse (CALD) status, LGBTQA+ status and the corresponding risky behaviour in 2020–21.

We also investigated how the same risky behaviours in 2020–21 were associated with current e-cigarette use in 2022 using multivariable Poisson regression analyses, with robust error variances. Separate models were also fitted for each risky behaviour. Covariates included in the models were age, region, socio-economic disadvantage, First Nations status, depression in the past 2 weeks, anxiety in the past 2 weeks, employment status, relationship status, education, CALD status, LGBTQA+ status and current vaping in 2020–21.

All covariates were from Wave 3, except for CALD status, which included information from Waves 1 and 3 (see above). We also conducted sensitivity analyses for both questions; one set of analyses excluded First Nations status and the other excluded CALD status. In additional sensitivity analyses for both questions, we investigated how problem gambling (instead of gambling at least weekly) was associated with current e-cigarette use. We performed goodness-of-fit tests for all multinomial logistic and Poisson regression analyses. For multinomial logistic regression analyses, we used a goodness-of-fit test specific for multinomial logistic regression models, which produces the same results as the Hosmer-Lemeshow goodness-of-fit test (Fagerland et al., 2008). For Poisson regression analyses, we used deviance and Pearson goodness-of-fit tests. All *p*-values from these tests were greater than 0.58, meaning that there was no evidence that the models were inappropriate. All analyses for research question 2 were unweighted.

Research question 3

We investigated how (a) current e-cigarette use and (b) nicotine presence in 2020–21 were associated with mental health (mild or moderate/severe anxiety in the past 2 weeks, mild or moderate/severe depression in the past 2 weeks, suicidal thoughts in the past 12 months or suicidal plans in the past 12 months) in 2022. For anxiety and depression, we used multivariable multinomial logistic regression and for suicidal thoughts and suicidal plans, we used multivariable Poisson regression, with robust error variances. Separate models were fitted for each mental health variable. Covariates included in the models were age, current smoking, alcohol consumption, illicit drug use in the past 4 weeks, gambling at least weekly, socio-economic

disadvantage, education, CALD status, First Nations status, LGBTQA+ status, region, employment status, relationship status (separated into 'relationship' versus 'no relationship') and the corresponding mental health variable from 2020–21.

We also investigated how the same measures of mental ill-health in 2020–21 were associated with (a) current e-cigarette use and (b) nicotine presence in 2022. For current vaping, we used multivariable Poisson regression, with robust error variances and for nicotine presence, we used multivariable multinomial logistic regression. Separate models were fitted for each mental health variable. Covariates included in the models were age, current smoking, alcohol consumption, illicit drug use in the past 4 weeks, gambling at least weekly, socio-economic disadvantage, education, CALD status, First Nations status, LGBTQA+ status, region, employment status, relationship status (separated into 'relationship' versus 'no relationship') and the corresponding current vaping or nicotine presence variable from 2020–21 (i.e. current vaping for current vaping models and nicotine presence for nicotine presence models).

All covariates were from Wave 3, except for CALD status, which included information from Waves 1 and 3 (see above). We also conducted sensitivity analyses for both questions; one set of analyses excluded First Nations status and the other excluded CALD status. We performed goodness-of-fit tests for all multinomial logistic and Poisson regression analyses. For multinomial logistic regression analyses, we used a goodness-of-fit test specific for multinomial logistic regression models, which produces the same results as the Hosmer-Lemeshow goodness-of-fit test (Fagerland et al., 2008). For Poisson regression analyses, we used deviance and Pearson goodness-of-fit tests. All *p*-values were greater than 0.05, meaning that there was no evidence that the models were inappropriate. All analyses for research question 3 were unweighted.

Strengths, limitations and data considerations

This *Ten to Men* snapshot has many unique strengths. Firstly, the data are from a nationally representative study, which can allow findings to be generalised more broadly to the Australian population. Additionally, it uses longitudinal data, which is rare in the vaping literature and enabled us to examine the directionality of associations of vaping with risky health behaviours and mental health, adding to previous cross-sectional research in this field. It also includes a wide range of ages, with men from 18 to 65 years included in Wave 4 of *Ten to Men*. This contrasts with previous research, which has predominantly focused on adolescents and/or young adults.

We also collected information on the presence and concentration of nicotine in e-cigarettes, allowing us to determine whether nicotine-free and/or nicotine-containing e-cigarettes were associated with poor mental health. Moreover, we obtained information on a wide range of risky health behaviours (alcohol consumption, smoking, gambling and illicit drug use) and considered how each of these were associated with vaping. In particular, comprehensive data were collected on various types of gambling and illicit drug use in *Ten to Men*.

This snapshot also has some limitations. Firstly, the sample size of current vapers was small overall (n = 282 in Wave 3 and n = 573 in Wave 4). This prevented us from conducting some subgroup analyses, such as the association of specific nicotine concentration or vaping frequency with mental ill-health, which may provide more detailed information. Additionally, sample sizes for some of the other measures, such as suicidal plans within the past 12 months, were small. There was only weak evidence of an association between suicidal plans and later vaping nicotine-free or nicotine e-cigarettes. Given that we observed an association between suicidal plans and later current vaping, the weak evidence for nicotine presence is likely due to the small sample size in the nicotine/no nicotine subgroups, rather than a true null association.

As in most longitudinal studies, a further limitation is loss to follow-up. Less than half of the available sample participated in Wave 4 and some of those who did participate had missing data on one or more variables and were, therefore, excluded from the multivariable analyses. It is plausible that men included in the analyses differed from those excluded (e.g. those excluded might have been more likely to vape and engage in other risky health behaviours or have mental health issues). However, if this was the case, the true associations between vaping and risky health behaviours or mental health would be even stronger than what we observed. Additionally, Wave 3 of *Ten to Men* was conducted in 2020–21, which was during

the COVID-19 pandemic. The closure of non-essential businesses may have led to fewer people purchasing vapes and/or using them in social settings, such as pubs, bars, nightclubs and music festivals, during the pandemic. This may partially explain the much lower prevalence of vaping in 2020–21 compared to 2022 when restrictions eased.

A further limitation is that data on vaping were only collected from 2 time points, limiting our understanding of the long-term health outcomes of vaping. Further research into the longer-term physical and mental health outcomes of vaping using *Ten to Men* and other data would be valuable. Finally, as in all observational studies, there is also the potential for residual confounding. However, we included a good number of covariates in our regression models, so this impact is likely to be minimal.

Full results

Table S2: Population-weighted prevalence of current vaping and ever vaping, and the frequency of vaping and nicotine concentration for males who were current vapers in Wave 3 and Wave 4

Variable	Wave 3 (%)	Wave 4 (%)
Current vaping (*N* = 7,769 for Wave 3; *N* = 6,837 for Wave 4)	**4.4**	**12.5**
Ever vaping (*N* = 7,798 for Wave 3; *N* = 6,990 for Wave 4)	**16.8**	**25.3**
Vaping frequency (for current vapers) (*N* = 282 for Wave 3; *N* = 573 for Wave 4)		
Less than monthly	39.4	40.3
At least monthly (but not weekly)	4.7	7.8
At least weekly (but not daily)	9.0	10.7
Once a day	4.8	4.3
2–5 times a day	10.7	8.5
More than 5 times a day	31.5	28.4
Nicotine concentration (for current vapers) (*N* = 234 for Wave 3; *N* = 402 for Wave 4)		
0 mg (nicotine-free)	24.7	23.4
1–7 mg	49.1	50.8
8–16 mg	21.7	21.9
More than 16 mg	4.5	3.9

Source: TTM data, population-weighted percentages and unweighted sample sizes, Waves 3 and 4

Table S3: Population-weighted prevalence of vaping by age and other factors in Wave 4

Variable	Prevalence of current e-cigarette users (%)	Prevalence of non e-cigarette users (%)
Age (*N* = 6,837)		
18–24	30.4	69.6
25–34	24.3	75.7
35–44	8.1	91.9
45–54	4.2	95.8
55–65	2.6	97.4
Region (*N* = 6,597)		
Major cities	14.0	86.0
Inner regional	8.5	91.5
Outer regional/remote/very remote	8.3	91.7
First Nations status (*N* = 6,094)		
First Nations	21.4	78.6
Not First Nations	12.1	87.9
SEIFA disadvantage (*N* = 6,574)		
High disadvantage	12.9	87.1
Medium disadvantage	11.2	88.8
Low disadvantage	15.2	84.8
Disability (*N* = 6,824)		
Without disability	12.5	87.5
With disability	13.3	86.7
LGBTQA+ status (*N* = 5,959)		
Not male-identifying and/or non-heterosexual	22.7	77.3
Male-identifying heterosexual	10.9	89.1
Loneliness (*N* = 6,021)		
Not lonely	10.6	89.4
Lonely	15.3	84.7

Source: TTM data, population-weighted prevalences and unweighted sample sizes, Waves 3 and 4

Table S4: Parameter estimates from multivariable Poisson or multinominal logistic regressions examining the relationship between current vaping in Wave 3 and risky behaviours in Wave 4 (illicit drug use in the past 4 weeks, gambling at least weekly, current smoking and alcohol consumption)

	Illicit drug use[a]			Gambling[a,b]			Current smoking[a]			Alcohol consumption (up to 4 standard drinks, compared to non-drinkers)[c,d]			Alcohol consumption (5 or more standard drinks, compared to non-drinkers		
	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Current e-cigarette user (ref. = not current e-cigarette user)	1.33	1.06,1.67	.01	1.27	0.80,2.03	.31	1.59	1.26,1.99	<.01	0.88	0.36,2.15	.77	0.80	0.31,2.06	.64
Covariates															
Age	0.98	0.98,0.99	<.01	0.99	0.99,1.00	.17	1.00	1.00,1.01	.21	1.00	0.99,1.02	.95	0.99	0.97,1.00	.11
Region (ref. = major cities)															
Inner regional	0.91	0.76,1.09	.31	1.21	0.99,1.46	.06	1.12	0.97,1.29	.13	0.92	0.64,1.33	.66	1.00	0.66,1.50	.98
Outer regional/ remote/very remote	0.99	0.80,1.23	.96	1.00	0.79,1.28	.99	1.09	0.90,1.31	.38	0.86	0.57,1.30	.47	1.14	0.72,1.80	.58
SEIFA Index (ref. = high disadvantage)															
Medium disadvantage	0.84	0.72,0.99	.04	0.98	0.81,1.20	.86	0.93	0.81,1.07	.33	1.18	0.84,1.67	.34	1.22	0.83,1.79	.30
Low disadvantage	0.77	0.61,0.97	.03	1.10	0.87,1.39	.41	0.90	0.75,1.09	.29	1.21	0.79,1.84	.39	1.33	0.83,2.13	.24
Aboriginal and Torres Strait Islander	1.30	0.84,2.02	.23	0.92	0.44,1.93	.83	0.87	0.52,1.44	.58	1.02	0.37,2.85	.97	1.19	0.38,3.69	.77
Depression (ref. = no or minimal depression)															
Mild depression	1.08	0.88,1.33	.45	0.89	0.70,1.13	.33	0.99	0.84,1.17	.94	0.70	0.47,1.05	.08	0.95	0.62,1.47	.82
Moderate or severe depression	1.20	0.92,1.56	.18	0.88	0.64,1.20	.67	1.15	0.93,1.42	.20	1.08	0.60,1.97	.79	1.31	0.68,2.54	.42
Anxiety (ref. = no or minimal anxiety)															
Mild anxiety	1.06	0.85,1.31	.61	1.16	0.90,1.50	.25	1.09	0.92,1.30	.31	1.01	0.65,1.57	.95	0.99	0.61,1.61	.98
Moderate or severe anxiety	1.04	0.79,1.38	.76	0.91	0.58,1.43	.67	1.03	0.81,1.32	.80	0.56	0.29,1.07	.08	0.63	0.31,1.30	.21
Employed (ref. = employed)															
Unemployed	1.20	0.92,1.57	.18	0.97	0.61,1.56	.91	1.08	0.85,1.38	.52	0.55	0.29,1.06	.07	0.50	0.24,1.04	.06
Not in Labour Force	1.02	0.79,1.31	.90	0.89	0.61,1.31	.56	0.88	0.72,1.08	.23	0.42	0.25,0.73	<.01	0.52	0.28,0.95	.03
Relationship status (ref. = single)															
Relationship	0.86	0.71,1.04	.12	0.95	0.70,1.30	.77	0.99	0.84,1.18	.95	2.19	1.40,3.42	<.01	1.77	1.07,2.91	.03

	Illicit drug use[a]			Gambling[a,b]			Current smoking[a]			Alcohol consumption (up to 4 standard drinks, compared to non-drinkers)[c,d]			Alcohol consumption (5 or more standard drinks, compared to non-drinkers		
	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Divorced/separated/ widowed	1.12	0.78,1.62	.54	0.84	0.53,1.34	.47	1.04	0.79,1.36	.79	2.59	1.09,6.16	.03	3.24	1.26,8.37	.02
Education (ref. = less than year 12)															
Year 12	1.13	0.86,1.47	.38	0.94	0.68,1.31	.72	0.97	0.78,1.22	.83	1.30	0.68,2.47	.43	0.97	0.47,1.99	.94
Some post-school	0.95	0.77,1.18	.65	0.96	0.75,1.22	.73	1.00	0.87,1.17	.96	1.19	0.71,2.01	.51	1.09	0.62,1.94	.76
University	0.89	0.69,1.13	.34	0.84	0.64,1.10	.20	0.78	0.64,0.95	.01	1.14	0.67,1.95	.63	0.80	0.44,1.45	.47
CALD	0.99	0.85,1.15	.86	1.03	0.87,1.22	.76	1.04	0.92,1.19	.50	0.87	0.65,1.17	.36	0.81	0.58,1.13	.22
Male-identifying heterosexual (ref. = not male identifying and/or non-heterosexual)	0.73	0.59,0.91	<.01	1.13	0.70,1.82	.61	0.78	0.62,0.96	.02	0.34	0.18,0.63	<.01	0.36	0.18,0.71	<.01
Illicit drug use in the past 4 weeks in Wave 3 (ref. = no)	13.89	11.53,16.73	<.01	-	-	-	-	-	-	-	-	-	-	-	-
Gambling at least weekly in Wave 3 (ref. = no)	-	-	-	26.41	21.57,32.35	<.01	-	-	-	-	-	-	-	-	-
Current smoker in Wave 3 (ref. = no)	-	-	-	-	-	-	25.64	20.85,31.55	<.01	-	-	-	-	-	-
Alcohol consumption in Wave 3 (ref. = non-drinker)															
Up to 4 standard drinks	-	-	-	-	-	-	-	-	-	151.86	110.20,209.28	<.01	81.11	45.64,144.14	<.01
5 or more standard drinks	-	-	-	-	-	-	-	-	-	73.82	45.44,119.93	<.01	825.47	423.78,1607.90	<.01

Notes: aRR = adjusted risk ratio; 95% CI = 95% confidence interval. Models adjusted for age, region, socio-economic disadvantage, First Nations status, depression in the past 2 weeks, anxiety in the past 2 weeks, employment status, relationship status, education, CALD status, LGBTQA+ status and the relevant risky behaviour in Wave 3 (e.g. illicit drug use in Wave 3 for the illicit drug use model). a Estimated from multivariable Poisson regression; b In sensitivity analyses, which considered problem gambling instead of gambling at least weekly, there was also no association between current vaping in Wave 3 and gambling in Wave 4; c Estimated from multivariable multinomial logistic regression; d Overall *p*-value for alcohol consumption (up to 4 and 5 or more standard drinks, compared to non-drinkers) was 0.88. **Illicit drug use model, *N* = 4,774; gambling model, *N* = 4,807; current smoking model, *N* = 4,956; alcohol model, *N* = 4,939.**

Source: TTM data, unweighted, Waves 3 and 4

Table S5: Parameter estimates from multivariable Poisson regressions examining the relationship between risky behaviours in Wave 3 (illicit drug use in the past 4 weeks, gambling at least weekly, current smoking and alcohol consumption) and current vaping in Wave 4

	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Illicit drugs in past 4 weeks (ref. = no illicit drugs in past 4 weeks)	2.29	1.71,3.06	<.01	-	-	-	-	-	-	-	-	-
Gambling at least weekly (ref. = not gambling at least weekly)a	-	-	-	2.03	1.41,2.92	<.01	-	-	-	-	-	-
Current smoker (ref. = not current smoker)	-	-	-	-	-	-	2.71	2.02,3.65	<.01	-	-	-
Alcohol consumption (ref. = non-drinker) (overall *p*-value < .01)												
Up to 4 standard drinks	-	-	-	-	-	-	-	-	-	1.22	0.78,1.91	.38
5 or more standard drinks	-	-	-	-	-	-	-	-	-	1.80	1.12,2.89	.02
Covariates												
Age	0.94	0.93,0.96	<.01	0.94	0.92,0.95	<.01	0.94	0.92,0.95	<.01	0.94	0.92,0.95	<.01
Region (ref. = major cities)												
Inner regional	0.69	0.51,0.93	.02	0.68	0.50,0.93	.02	0.69	0.51,0.95	.02	0.68	0.50,0.93	.02
Outer regional/remote/very remote	0.51	0.34,0.76	<.01	0.55	0.38,0.80	<.01	0.51	0.34,0.77	<.01	0.53	0.36,0.77	<.01
SEIFA Index (ref. = high disadvantage)												
Medium disadvantage	0.77	0.59,1.02	.07	0.83	0.64,1.09	.18	0.87	0.66,1.15	.33	0.82	0.63,1.07	.14
Low disadvantage	0.60	0.42,0.84	<.01	0.70	0.50,0.98	.04	0.68	0.47,0.97	.03	0.66	0.47,0.93	.02
Aboriginal and Torres Strait Islander	0.69	0.36,1.34	.28	0.60	0.30,1.22	.16	0.48	0.23,1.01	.05	0.81	0.45,1.46	.47
Depression (ref. = no or minimal depression)												
Mild depression	1.31	0.97,1.76	.08	1.37	1.02,1.84	.03	1.33	0.98,1.80	.06	1.34	1.00,1.79	.05
Moderate or severe depression	1.38	0.92,2.07	.12	1.49	1.01,2.20	.05	1.58	1.07,2.34	.02	1.45	0.97,2.15	.07
Anxiety (ref. = no or minimal anxiety)												
Mild anxiety	1.01	0.73,1.39	.96	1.04	0.76,1.42	.82	1.05	0.76,1.45	.78	1.04	0.76,1.43	.80
Moderate or severe anxiety	0.89	0.56,1.42	.62	0.92	0.58,1.44	.70	0.99	0.63,1.54	.95	0.89	0.56,1.41	.63
Employed (ref. = employed)												
Unemployed	0.99	0.56,1.74	.97	1.13	0.67,1.89	.65	0.85	0.47,1.54	.59	1.10	0.64,1.87	.74

	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Not in Labour Force	0.86	0.44,1.70	.67	0.97	0.52,1.81	.93	0.87	0.42,1.77	.69	0.95	0.50,1.79	.87
Relationship status (ref. = single)												
Relationship	0.78	0.57,1.07	.13	0.85	0.63,1.16	.31	0.97	0.69,1.35	.85	0.87	0.64,1.19	.38
Divorced/separated/widowed	0.84	0.44,1.61	.60	0.87	0.46,1.66	.67	0.91	0.47,1.77	.78	0.91	0.47,1.76	.77
Education (ref. = less than year 12)												
Year 12	0.73	0.45,1.18	.20	0.77	0.48,1.25	.30	0.78	0.47,1.31	.35	0.68	0.42,1.12	.13
Some post-school	0.86	0.58,1.29	.47	0.89	0.58,1.35	.58	0.95	0.62,1.44	.80	0.81	0.53,1.23	.32
University	0.81	0.53,1.23	.32	0.78	0.51,1.19	.25	0.90	0.58,1.40	.65	0.71	0.46,1.10	.13
CALD	1.15	0.91,1.45	.24	1.13	0.90,1.41	.28	1.11	0.88,1.40	.36	1.14	0.91,1.43	.26
Male-identifying heterosexual (ref. = not male identifying and/or non-heterosexual)	1.20	0.85,1.69	.31	1.09	0.77,1.53	.64	1.07	0.76,1.51	.69	1.13	0.80,1.61	.48
Current e-cigarette user in Wave 3 (ref. = not current e-cigarette user)	10.15	7.58,13.58	<.01	13.14	10.27,16.83	<.01	10.24	7.70,13.62	<.01	11.23	8.59,14.67	<.01

Notes: aRR = adjusted risk ratio; 95% CI = 95% confidence interval. Models adjusted for age, region, socio-economic disadvantage, First Nations status, depression in the past 2 weeks, anxiety in the past 2 weeks, employment status, relationship status, education, CALD status, LGBTQA+ status and current vaping in Wave 3. a In sensitivity analyses, which considered problem gambling instead of gambling at least weekly, there was no association between gambling in Wave 3 and current vaping in Wave 4.
Illicit drug use model, *N* = 4,808; gambling model, *N* = 4,866; current smoking model, *N* = 4,861; alcohol model, *N* = 4,859.

Source: TTM data, unweighted, Waves 3 and 4

Table S6: Parameter estimates from multivariable Poisson or multinominal logistic regressions examining the relationship between current vaping in Wave 3 and mental health in Wave 4 (mild or moderate/severe anxiety in the past 2 weeks, mild or moderate/severe depression in the past 2 weeks, suicidal thoughts in the past 12 months or suicidal plans in the past 12 months)

	Mild anxiety[a,b] (ref. = no or minimal anxiety)			Moderate or severe anxiety[a,b] (ref. = no or minimal anxiety)			Mild depression[a,b] (ref. = no or minimal depression)			Moderate or severe depression[a,b] (ref. = no or minimal depression)			Suicidal thoughts in past 12 months[c] (ref. = no)			Suicidal plans in past 12 months[c] (ref. = no)		
	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Current e-cigarette user (ref. = not current e-cigarette user)	1.18	0.74,1.89	.48	1.29	0.67,2.47	.44	0.99	0.62,1.58	.96	1.02	0.55,1.88	.96	0.96	0.50,1.82	.89	0.90	0.51,1.58	.71
Covariates																		
Age	0.98	0.97,0.99	<.01	0.98	0.97,0.99	<.01	0.98	0.97,0.99	<.01	0.98	0.96,0.99	<.01	0.99	0.98,1.00	.22	0.98	0.97,1.00	.02
Current smoker (ref. = not current smoker)	0.83	0.63,1.10	.19	0.72	0.47,1.09	.12	1.01	0.77,1.32	.94	0.89	0.61,1.30	.55	1.18	0.81,1.71	.38	1.06	0.67,1.70	.79
Alcohol consumption (ref. = non-drinker)																		
Up to 4 standard drinks	1.09	0.84,1.43	.51	1.24	0.82,1.88	.30	1.07	0.83,1.39	.60	0.97	0.67,1.40	.87	0.84	0.57,1.24	.37	1.64	0.85,3.16	.14
5 or more standard drinks	1.18	0.88,1.60	.27	1.42	0.90,2.25	.13	1.22	0.91,1.63	.19	1.00	0.66,1.52	.98	0.81	0.50,1.30	.38	1.54	0.76,3.10	.23
Illicit drugs in past 4 weeks (ref. = no illicit drugs in past 4 weeks)	1.20	0.91,1.59	.20	1.25	0.84,1.86	.27	1.18	0.89,1.57	.24	1.29	0.88,1.88	.19	1.46	1.02,2.09	.04	1.69	1.19,2.42	<.01
Gambling at least weekly (ref. = not gambling at least weekly)	1.08	0.79,1.47	.63	0.91	0.55,1.50	.70	1.16	0.86,1.56	.32	0.65	0.40,1.06	.09	1.49	0.90,2.49	.12	0.96	0.52,1.79	.90
SEIFA Index (ref. = high disadvantage)																		
Medium disadvantage	1.09	0.89,1.32	.41	0.88	0.66,1.19	.41	1.14	0.94,1.38	.17	0.98	0.74,1.29	.87	1.07	0.78,1.45	.68	0.94	0.67,1.30	.70
Low disadvantage	1.11	0.87,1.41	.41	0.88	0.60,1.28	.50	1.01	0.80,1.28	.91	1.01	0.71,1.42	.96	0.91	0.61,1.36	.65	0.63	0.39,1.02	.06
Education (ref. = less than year 12)																		
Year 12	1.10	0.76,1.60	.61	1.35	0.79,2.32	.27	1.07	0.74,1.53	.73	0.79	0.48,1.31	.37	0.64	0.37,1.10	.10	0.85	0.43,1.69	.64
Some post-school	1.04	0.77,1.40	.80	1.03	0.67,1.61	.88	0.97	0.73,1.30	.86	0.77	0.51,1.14	.19	0.88	0.59,1.32	.54	1.29	0.74,2.23	.36
University	0.87	0.63,1.18	.36	0.78	0.49,1.25	.31	0.78	0.58,1.06	.11	0.53	0.35,0.81	<.01	0.67	0.42,1.06	.08	0.84	0.47,1.51	.57
CALD	1.04	0.88,1.22	.68	0.89	0.68,1.16	.38	0.94	0.80,1.10	.44	0.83	0.66,1.06	.14	1.00	0.75,1.33	.98	1.20	0.89,1.62	.24
Aboriginal and Torres Strait Islander	0.94	0.50,1.75	.84	0.98	0.43,2.23	.95	0.89	0.48,1.66	.71	0.84	0.39,1.84	.67	1.24	0.63,2.43	.53	1.27	0.63,2.54	.50

	Mild anxiety[a,b] (ref. = no or minimal anxiety)			Moderate or severe anxiety[a,b] (ref. = no or minimal anxiety)			Mild depression[a,b] (ref. = no or minimal depression)			Moderate or severe depression[a,b] (ref. = no or minimal depression)			Suicidal thoughts in past 12 months[c] (ref. = no)			Suicidal plans in past 12 months[c] (ref. = no)		
	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Male-identifying heterosexual (ref. = not male identifying and/or non-heterosexual)	0.82	0.59,1.13	.23	0.75	0.48,1.19	.22	0.84	0.61,1.17	.31	0.68	0.45,1.05	.08	0.67	0.43,1.04	.07	0.64	0.39,1.04	.07
Region (ref. = major cities)																		
Inner regional	1.05	0.86,1.29	.60	1.03	0.75,1.40	.87	1.13	0.94,1.38	.20	1.16	0.87,1.55	.31	1.13	0.83,1.56	.44	1.02	0.71,1.47	.90
Outer regional/remote/ very remote	1.01	0.79,1.28	.95	1.12	0.78,1.60	.53	1.04	0.82,1.30	.76	1.35	0.97,1.87	.08	0.85	0.56,1.27	.42	0.97	0.64,1.47	.89
Employed (ref. = employed)																		
Unemployed	0.98	0.65,1.47	.92	1.24	0.72,2.14	.44	1.12	0.75,1.67	.59	1.30	0.78,2.14	.31	1.71	1.09,2.68	.02	1.33	0.79,2.22	.28
Not in Labour Force	1.49	1.06,2.09	.02	2.25	1.44,3.50	<.01	1.34	0.94,1.93	.11	2.43	1.58,3.74	<.01	1.42	0.91,2.23	.13	2.23	1.34,3.72	<.01
Relationship (ref. = no relationship)	0.86	0.68,1.08	.20	0.82	0.59,1.15	.24	0.90	0.72,1.14	.40	0.73	0.54,0.99	.04	0.76	0.56,1.05	.10	1.11	0.74,1.67	.60
Anxiety in Wave 3 (ref. = no or minimal anxiety)																		
Mild anxiety	6.07	5.08,7.24	<.01	11.79	8.72,15.95	<.01	-	-	-	-	-	-	-	-	-	-	-	-
Moderate or severe anxiety	11.60	8.53,15.79	<.01	81.18	56.64,116.34	<.01	-	-	-	-	-	-	-	-	-	-	-	-
Depression in Wave 3 (ref. = no or minimal depression)																		
Mild depression	-	-	-	-	-	-	6.16	5.21,7.28	<.01	13.64	10.08,18.44	<.01	-	-	-	-	-	-
Moderate or severe depression	-	-	-	-	-	-	11.30	8.41,15.18	<.01	140.18	98.65,199.19	<.01	-	-	-	-	-	-
Suicidal thoughts in past 12 months in Wave 3 (ref. = no suicidal thoughts in past 12 months)	-	-	-	-	-	-	-	-	-	-	-	-	15.17	11.48,20.06	<.01	-	-	-
Suicidal plans in past 12 months in Wave 3 (ref. = no suicidal plans in past 12 months)	-	-	-	-	-	-	-	-	-	-	-	-	-	-		16.13	12.03,21.62	<.01

Notes: aRR = adjusted risk ratio; 95% CI = 95% confidence interval. Models adjusted for age, current smoking, alcohol consumption, illicit drug use in the past 4 weeks, gambling at least weekly, socio-economic disadvantage, education, CALD status, First Nations status, LGBTQA+ status, region, employment status, relationship status and the corresponding mental health variable from Wave 3 (e.g. anxiety in Wave 3 for the anxiety model). a Estimated from multivariable multinomial logistic regression; b Overall *p*-value for anxiety (mild and moderate/severe, compared to no or minimal anxiety) was 0.67 and overall *p*-value for depression (mild and moderate/severe, compared to no or minimal depression) was 1.00; c Estimated from multivariable Poisson regression.
Anxiety model, *N* = 4,880; depression model, *N* = 4,865; suicidal thoughts model, *N* = 4,150; suicidal plans model, *N* = 4,179

Source: TTM data, unweighted, Waves 3 and 4

Table S7: Parameter estimates from multivariable Poisson or multinominal logistic regressions examining the relationship between nicotine presence in Wave 3 and mental health in Wave 4 (mild or moderate/severe anxiety in the past 2 weeks, mild or moderate/severe depression in the past 2 weeks, suicidal thoughts in the past 12 months or suicidal plans in the past 12 months)

	Mild anxiety[a,b] (ref. = no or minimal anxiety)			Moderate or severe anxiety[a,b] (ref. = no or minimal anxiety)			Mild depression[a,c] (ref. = no or minimal depression)			Moderate or severe depression[a,c] (ref. = no or minimal depression)			Suicidal thoughts in past 12 months[d] (ref. = no)			Suicidal plans in past 12 months[d] (ref. = no)		
	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Vaping (ref. = do not vape)																		
Nicotine-free	1.00	0.37,2.75	.99	1.02	0.26,3.97	.97	0.91	0.34,2.42	.86	0.68	0.19,2.46	.56	1.39	0.48,4.07	.55	1.34	0.63,2.86	.45
Nicotine present	1.42	0.83,2.42	.20	1.59	0.75,3.38	.23	1.20	0.69,2.08	.51	1.16	0.56,2.40	.69	0.85	0.39,1.87	.69	1.02	0.57,1.82	.95
Covariates																		
Age	0.98	0.97,0.99	<.01	0.98	0.97,0.99	<.01	0.98	0.97,0.99	<.01	0.98	0.96,0.99	<.01	0.99	0.98,1.00	.22	0.99	0.97,1.00	.04
Current smoker (ref. = not current smoker)	0.83	0.63,1.10	.20	0.72	0.47,1.10	.13	1.00	0.77,1.31	.98	0.89	0.61,1.29	.53	1.18	0.82,1.70	.38	1.12	0.72,1.74	.61
Alcohol consumption (ref. = non-drinker)																		
Up to 4 standard drinks	1.10	0.84,1.43	.49	1.25	0.82,1.89	.30	1.07	0.83,1.39	.60	0.97	0.67,1.40	.88	0.83	0.57,1.23	.36	1.65	0.86,3.19	.13
5 or more standard drinks	1.20	0.89,1.62	.24	1.43	0.91,2.27	.12	1.23	0.91,1.65	.18	1.00	0.66,1.51	1.00	0.81	0.50,1.30	.38	1.58	0.79,3.19	.20
Illicit drugs in past 4 weeks (ref. = no illicit drugs in past 4 weeks)	1.21	0.91,1.60	.19	1.26	0.85,1.88	.24	1.18	0.89,1.56	.25	1.29	0.88,1.88	.20	1.47	1.03,2.10	.04	1.78	1.26,2.52	<.01
Gambling at least weekly (ref. = not gambling at least weekly)	1.05	0.77,1.44	.74	0.89	0.54,1.48	.66	1.16	0.86,1.56	.32	0.65	0.40,1.07	.09	1.49	0.90,2.48	.12	0.94	0.50,1.74	.84
SEIFA Index (ref. = high disadvantage)																		
Medium disadvantage	1.09	0.89,1.32	.42	0.88	0.65,1.18	.40	1.14	0.94,1.38	.17	0.98	0.75,1.29	.89	1.08	0.79,1.47	.64	0.93	0.67,1.29	.66
Low disadvantage	1.10	0.86,1.40	.45	0.86	0.59,1.26	.45	1.01	0.80,1.28	.92	1.00	0.71,1.41	.98	0.92	0.61,1.37	.67	0.63	0.39,1.02	.06
Education (ref. = less than year 12)																		
Year 12	1.11	0.76,1.60	.59	1.36	0.79,2.33	.27	1.06	0.74,1.53	.73	0.79	0.48,1.30	.35	0.65	0.38,1.13	.13	0.91	0.46,1.82	.80
Some post-school	1.04	0.77,1.40	.80	1.04	0.67,1.62	.86	0.97	0.73,1.30	.86	0.76	0.51,1.13	.17	0.90	0.59,1.37	.63	1.39	0.80,2.41	.24
University	0.87	0.64,1.19	.39	0.79	0.50,1.27	.33	0.78	0.58,1.06	.12	0.53	0.34,0.80	<.01	0.69	0.43,1.10	.12	0.92	0.51,1.67	.79
CALD	1.03	0.88,1.22	.69	0.88	0.67,1.14	.33	0.94	0.80,1.10	.42	0.83	0.65,1.05	.12	1.00	0.75,1.34	.99	1.18	0.87,1.58	.29
Aboriginal and Torres Strait Islander	0.93	0.50,1.74	.82	0.96	0.42,2.20	.92	0.88	0.47,1.65	.69	0.85	0.39,1.85	.68	1.25	0.64,2.45	.51	1.20	0.60,2.40	.61

	Mild anxiety[a,b] (ref. = no or minimal anxiety)			Moderate or severe anxiety[a,b] (ref. = no or minimal anxiety)			Mild depression[a,c] (ref. = no or minimal depression)			Moderate or severe depression[a,c] (ref. = no or minimal depression)			Suicidal thoughts in past 12 months[d] (ref. = no)			Suicidal plans in past 12 months[d] (ref. = no)		
	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Male-identifying heterosexual (ref. = not male identifying and/or non-heterosexual)	0.81	0.59,1.13	.21	0.74	0.47,1.17	.19	0.85	0.61,1.18	.33	0.69	0.45,1.06	.09	0.68	0.44,1.06	.09	0.60	0.38,0.95	.03
Region (ref. = major cities)																		
Inner regional	1.06	0.86,1.29	.60	1.01	0.74,1.38	.94	1.13	0.93,1.37	.21	1.14	0.85,1.52	.38	1.13	0.82,1.55	.46	1.02	0.71,1.46	.93
Outer regional/remote/ very remote	1.02	0.80,1.29	.87	1.14	0.80,1.63	.47	1.04	0.82,1.31	.75	1.33	0.96,1.85	.09	0.84	0.56,1.27	.41	1.03	0.69,1.54	.87
Employed (ref. = employed)																		
Unemployed	0.97	0.65,1.46	.89	1.23	0.71,2.12	.45	1.11	0.74,1.67	.60	1.30	0.78,2.14	.31	1.71	1.09,2.68	.02	1.32	0.79,2.20	.29
Not in labour force	1.51	1.07,2.11	.02	2.27	1.46,3.54	<.01	1.34	0.94,1.93	.11	2.38	1.54,3.66	<.01	1.43	0.91,2.25	.12	2.42	1.49,3.93	<.01
Relationship (ref. = no relationship)	0.85	0.68,1.08	.18	0.81	0.58,1.14	.23	0.90	0.72,1.14	.40	0.73	0.54,0.99	.05	0.76	0.55,1.05	.10	1.09	0.74,1.62	.66
Anxiety in Wave 3 (ref. = no or minimal anxiety)																		
Mild anxiety	6.08	5.09,7.26	<.01	11.81	8.73,15.98	<.01	-	-	-	-	-	-	-	-	-	-	-	-
Moderate or severe anxiety	11.74	8.62,16.00	<.01	81.53	56.81,117.02	<.01	-	-	-	-	-	-	-	-	-	-	-	-
Depression in Wave 3 (ref. = no or minimal depression)																		
Mild depression	-	-	-	-	-	-	6.15	5.20,7.28	<.01	13.52	9.99,18.30	<.01	-	-		-	-	-
Moderate or severe depression	-	-	-	-	-	-	11.20	8.34,15.06	<.01	139.96	98.48,198.92	<.01	-	-	-	-	-	-
Suicidal thoughts in past 12 months in Wave 3 (ref. = no suicidal thoughts in past 12 months)	-	-	-	-	-	-	-	-	-	-	-	-	15.14	11.45,20.02	<.01	-	-	-
Suicidal plans in past 12 months in Wave 3 (ref. = no suicidal plans in past 12 months)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.14	12.09,21.55	<.01

Notes: aRR, adjusted risk ratio; 95% CI, 95% confidence interval. Models adjusted for age, current smoking, alcohol consumption, illicit drug use in the past 4 weeks, gambling at least weekly, socio-economic disadvantage, education, CALD status, First Nations status, LGBTQA+ status, region, employment status, relationship status and the corresponding mental health variable in Wave 3 (e.g. anxiety in Wave 3 for the anxiety model). a Estimated from multivariable multinomial logistic regression; b Overall *p*-values for anxiety (mild and moderate/severe, compared to no or minimal anxiety) were 1.00 for nicotine-free and 0.33 for nicotine present e-cigarettes; c Overall *p*-values for depression (mild and moderate/severe, compared to no or minimal depression) were 0.84 for nicotine-free and 0.81 for nicotine present e-cigarettes; d Estimated from multivariable Poisson regression.
Anxiety model, *N* = 4,869; depression model, *N* = 4,854; suicidal thoughts model, *N* = 4,142; suicidal plans model, *N* = 4,170

Source: TTM data, unweighted, Waves 3 and 4

Table S8: Parameter estimates from multivariable Poisson regressions examining the relationship between mental health in Wave 3 (mild or moderate/severe anxiety in the past 2 weeks, mild or moderate/severe depression in the past 2 weeks, suicidal thoughts in the past 12 months or suicidal plans in the past 12 months) and current vaping in Wave 4

	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Anxiety (ref. = no or minimal anxiety) (overall *p*-value = 0.40)												
Mild anxiety	1.19	0.91,1.56	.21	-	-	-	-	-	-	-	-	-
Moderate or severe anxiety	1.17	0.81,1.67	.40	-	-	-	-	-	-	-	-	-
Depression (ref. = no or minimal depression) (overall *p*-value = 0.09)												
Mild depression	-	-	-	1.22	0.93,1.60	.15	-	-	-	-	-	-
Moderate or severe depression	-	-	-	1.38	1.02,1.87	.04	-	-	-	-	-	-
Suicidal thoughts in past 12 months (ref. = no suicidal thoughts in past 12 months)	-	-	-	-	-	-	1.90	1.27,2.85	<.01	-	-	-
Suicidal plans in past 12 months (ref. = no suicidal plans in past 12 months)	-	-	-	-	-	-	-	-	-	1.78	1.20,2.64	<.01
Covariates												
Age	0.94	0.93,0.95	<.01	0.94	0.93,0.95	<.01	0.94	0.93,0.95	<.01	0.94	0.93,0.95	<.01
Current smoker (ref. = not current smoker)	2.27	1.66,3.09	<.01	2.29	1.68,3.12	<.01	2.50	1.81,3.45	<.01	2.45	1.78,3.36	<.01
Alcohol consumption (ref. = non-drinker)												
Up to 4 standard drinks	1.11	0.70,1.76	.64	1.10	0.70,1.74	.68	1.10	0.67,1.82	.70	1.09	0.66,1.81	.75
5 or more standard drinks	1.45	0.88,2.39	.14	1.43	0.87,2.35	.16	1.45	0.85,2.48	.17	1.46	0.84,2.52	.18
Illicit drugs in past 4 weeks (ref. = no illicit drugs in past 4 weeks)	1.76	1.28,2.43	<.01	1.73	1.26,2.39	<.01	1.75	1.27,2.42	<.01	1.75	1.26,2.43	<.01
Gambling at least weekly (ref. = not gambling at least weekly)	1.67	1.14,2.44	.01	1.68	1.15,2.45	.01	1.71	1.16,2.52	.01	1.60	1.07,2.38	.02
SEIFA Index (ref. = high disadvantage)												

	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Medium disadvantage	0.81	0.62,1.06	.13	0.82	0.62,1.07	.14	0.80	0.61,1.06	.12	0.83	0.63,1.10	.20
Low disadvantage	0.56	0.39,0.80	<.01	0.57	0.40,0.82	<.01	0.51	0.34,0.75	<.01	0.52	0.36,0.77	<.01
Education (ref. = less than year 12)												
Year 12	0.73	0.44,1.21	.22	0.73	0.44,1.21	.22	0.86	0.50,1.49	.59	0.84	0.49,1.45	.53
Some post-school	0.90	0.60,1.34	.59	0.91	0.60,1.36	.64	1.04	0.66,1.65	.87	1.05	0.66,1.65	.85
University	0.93	0.61,1.43	.74	0.95	0.62,1.45	.80	1.07	0.65,1.75	.80	1.07	0.65,1.74	.80
CALD	1.18	0.93,1.49	.18	1.19	0.94,1.50	.14	1.20	0.94,1.53	.14	1.19	0.94,1.51	.16
Aboriginal and Torres Strait Islander	0.60	0.29,1.22	.16	0.58	0.28,1.21	.15	0.85	0.45,1.58	.60	0.58	0.27,1.24	.16
Male-identifying heterosexual (ref. = not male identifying and/or non-heterosexual)	1.13	0.78,1.63	.52	1.15	0.80,1.65	.46	1.19	0.81,1.75	.37	1.18	0.81,1.74	.39
Region (ref. = major cities)												
Inner regional	0.70	0.52,0.96	.03	0.70	0.51,0.96	.03	0.75	0.55,1.03	.08	0.73	0.54,1.00	.05
Outer regional/remote/very remote	0.49	0.32,0.73	<.01	0.49	0.33,0.74	<.01	0.43	0.28,0.66	<.01	0.44	0.29,0.67	<.01
Employed (ref. = employed)												
Unemployed	0.86	0.46,1.58	.62	0.79	0.42,1.49	.46	0.68	0.34,1.35	.27	0.68	0.34,1.37	.28
Not in labour force	0.78	0.35,1.75	.54	0.78	0.36,1.70	.53	0.87	0.39,1.94	.74	0.88	0.39,1.99	.75
Relationship (ref. = no relationship)	0.88	0.65,1.19	.41	0.90	0.67,1.22	.50	1.00	0.72,1.39	1.00	1.01	0.72,1.41	.96
Current e-cigarette user in Wave 3 (ref. = not current e-cigarette user)	9.63	7.04,13.17	<.01	9.44	6.90,12.92	<.01	9.45	6.84,13.04	<.01	9.36	6.80,12.90	<.01

Notes: aRR = adjusted risk ratio; 95% CI = 95% confidence interval. Models adjusted for age, current smoking, alcohol consumption, illicit drug use in the past 4 weeks, gambling at least weekly, socio-economic disadvantage, education, CALD status, First Nations status, LGBTQA+ status, region, employment status, relationship status (separated into 'relationship' versus 'no relationship') and current vaping in Wave 3. Anxiety model, *N* = 4,807; depression model, *N* = 4,797; suicidal thoughts model, *N* = 4,506; suicidal plans model, *N* = 4,531

Source: TTM data, unweighted, Waves 3 and 4

Table S9: Parameter estimates from multivariable multinomial logistic regressions examining the relationship between mental health in Wave 3 (mild or moderate/severe anxiety in the past 2 weeks, mild or moderate/severe depression in the past 2 weeks, suicidal thoughts in the past 12 months or suicidal plans in the past 12 months) and nicotine presence in Wave 4

	Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)			Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)			Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)			Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)		
	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Anxiety (ref. = no or minimal anxiety) (overall p-value of 0.10 for nicotine -free and 0.81 for nicotine present)																								
Mild anxiety	1.70	0.94, 3.09	.08	1.13	0.66, 1.96	.65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Moderate or severe anxiety	0.61	0.20, 1.88	.39	1.21	0.62, 2.37	.57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Depression (ref. = no or minimal depression) (overall p-value of 0.60 for nicotine-free and 0.08 for nicotine present)																								
Mild depression	-	-	-	-	-	-	1.37	0.74, 2.54	.32	1.30	0.75, 2.26	.35	-	-	-	-	-	-	-	-	-	-	-	-
Moderate or severe depression	-	-	-	-	-	-	1.10	0.49, 2.48	.82	1.96	1.09, 3.51	.02	-	-	-	-	-	-	-	-	-	-	-	-
Suicidal thoughts in past 12 months (ref. = no suicidal thoughts in past 12 months)	-	-	-	-	-	-	-	-	-	-	-	-	2.67	1.12, 6.38	.03	2.42	1.18, 4.96	.02	-	-	-	-	-	-
Suicidal plans in past 12 months (ref. = no suicidal plans in past 12 months)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.24	0.87, 5.75	.09	2.05	0.92, 4.59	.08
Covariates																								
Age	0.91	0.89, 0.94	<.01	0.91	0.89, 0.93	<.01	0.92	0.89, 0.94	<.01	0.91	0.89, 0.94	<.01	0.92	0.89, 0.94	<.01	0.91	0.89, 0.93	<.01	0.92	0.89, 0.94	<.01	0.91	0.89, 0.94	<.01
Current smoker (ref. = not current smoker)	2.15	0.98, 4.74	.06	5.84	3.47, 9.84	<.01	2.12	0.97, 4.64	.06	5.86	3.48, 9.87	<.01	2.53	1.15, 5.58	.02	6.56	3.77, 11.42	<.01	2.43	1.11, 5.33	.03	6.42	3.71, 11.12	<.01
Alcohol consumption (ref. = non-drinker)																								
Up to 4 standard drinks	1.91	0.58, 6.32	.29	0.88	0.40, 1.94	.75	1.91	0.58, 6.31	.29	0.85	0.39, 1.86	.68	1.62	0.49, 5.41	.43	0.91	0.36, 2.26	.83	1.61	0.48, 5.32	.44	0.87	0.35, 2.13	.76
5 or more standard drinks	2.23	0.62, 7.97	.22	1.71	0.75, 3.87	.20	2.24	0.63, 8.02	.21	1.59	0.70, 3.58	.27	2.01	0.56, 7.24	.28	1.60	0.62, 4.12	.33	1.92	0.53, 6.88	.32	1.62	0.64, 4.11	.31

	Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)			Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)			Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)			Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)		
	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Illicit drugs in past 4 weeks (ref. = no illicit drugs in past 4 weeks)	2.81	1.40, 5.62	<.01	3.24	1.94, 5.42	<.01	2.78	1.39, 5.56	<.01	3.12	1.87, 5.21	<.01	2.74	1.36, 5.55	.01	3.12	1.81, 5.37	<.01	2.77	1.37, 5.58	<.01	3.07	1.78, 5.29	<.01
Gambling at least weekly (ref. = not gambling at least weekly)	0.88	0.29, 2.67	.82	1.76	0.91, 3.44	.10	0.93	0.31, 2.76	.90	1.83	0.94, 3.57	.08	0.75	0.22, 2.56	.64	1.75	0.87, 3.52	.12	0.70	0.20, 2.39	.57	1.57	0.77, 3.18	.21
SEIFA Index (ref. = high disadvantage)																								
Medium disadvantage	0.64	0.35, 1.18	.16	0.72	0.43, 1.20	.20	0.64	0.35, 1.18	.15	0.73	0.43, 1.22	.23	0.64	0.35, 1.20	.17	0.76	0.44, 1.31	.32	0.67	0.36, 1.24	.20	0.82	0.47, 1.42	.47
Low disadvantage	0.49	0.22, 1.11	.09	0.91	0.47, 1.75	.77	0.49	0.22, 1.10	.08	0.91	0.47, 1.76	.78	0.47	0.20, 1.08	.07	0.88	0.43, 1.77	.71	0.48	0.21, 1.10	.08	0.93	0.46, 1.88	.85
Education (ref. = less than year 12)																								
Year 12	2.38	0.45, 12.58	.31	0.76	0.30, 1.96	.58	2.54	0.47, 13.62	.28	0.77	0.30, 2.00	.59	5.47	0.60, 50.07	.13	1.02	0.35, 2.97	.98	5.24	0.58, 47.47	.14	1.03	0.36, 2.96	.96
Some post-school	2.04	0.45, 9.32	.36	1.00	0.47, 2.12	.99	2.16	0.46, 10.06	.33	1.03	0.48, 2.22	.93	4.45	0.54, 36.57	.16	1.28	0.54, 3.04	.58	4.42	0.54, 35.95	.16	1.25	0.53, 2.94	.61
University	2.96	0.63, 13.80	.17	0.69	0.30, 1.58	.38	3.05	0.64, 14.56	.16	0.75	0.33, 1.72	.49	6.49	0.77, 54.57	.09	0.92	0.36, 2.36	.86	5.94	0.72, 49.24	.10	0.88	0.35, 2.23	.79
CALD	0.88	0.50, 1.55	.67	1.43	0.90, 2.28	.13	0.89	0.51, 1.56	.68	1.45	0.91, 2.30	.12	1.02	0.58, 1.81	.94	1.21	0.73, 1.98	.46	0.98	0.56, 1.73	.98	1.24	0.76, 2.03	.39
Aboriginal and Torres Strait Islander	0.40	0.04, 4.12	.44	0.61	0.12, 3.01	.55	0.45	0.05, 4.23	.49	0.58	0.11, 2.96	.51	0.60	0.07, 5.16	.64	0.98	0.22, 4.44	.98	0.44	0.05, 4.07	.47	0.61	0.12, 3.00	.54
Male-identifying heterosexual (ref. = not male identifying and/or non-heterosexual)	1.18	0.42, 3.27	.75	0.82	0.38, 1.77	.61	1.18	0.43, 3.25	.76	0.85	0.39, 1.84	.68	1.16	0.41, 3.25	.78	1.00	0.41, 2.43	.99	1.11	0.40, 3.05	.84	0.97	0.40, 2.32	.94
Region (ref. = major cities)																								
Inner regional	0.72	0.37, 1.42	.34	0.45	0.25, 0.84	.01	0.73	0.37, 1.43	.36	0.45	0.25, 0.84	.01	0.75	0.37, 1.49	.41	0.49	0.26, 0.93	.03	0.80	0.40, 1.56	.51	0.49	0.26, 0.92	.03
Outer regional/ remote/very remote	0.38	0.13, 1.10	.07	0.34	0.15, 0.79	.01	0.38	0.13, 1.10	.07	0.35	0.15, 0.80	.01	0.41	0.14, 1.18	.10	0.21	0.08, 0.55	<.01	0.39	0.14, 1.13	.08	0.23	0.09, 0.59	<.01
Employed (ref. = employed)																								
Unemployed	0.29	0.04, 2.40	.25	1.74	0.71, 4.25	.23	0.31	0.04, 2.53	.27	1.51	0.61, 3.75	.37	0.27	0.03, 2.25	.23	1.04	0.35, 3.06	.95	0.29	0.03, 2.36	.25	1.10	0.37, 3.22	.87

	Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)			Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)			Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)			Nicotine-free (ref. = do not vape)			Nicotine present (ref. = do not vape)		
	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*	aRR	95%CI	*p*
Not in labour force	0.45	0.06, 3.38	.44	1.94	0.83, 4.55	.13	0.46	0.06, 3.53	.46	1.68	0.70, 4.03	.24	0.48	0.06, 3.66	.48	2.10	0.86, 5.11	.10	0.51	0.07, 3.85	.52	2.30	0.96, 5.49	.06
Relationship (ref. = no relationship)	1.45	0.65, 3.23	.36	1.21	0.68, 2.13	.51	1.55	0.69, 3.49	.29	1.28	0.73, 2.27	.39	1.55	0.69, 3.50	.29	1.40	0.75, 2.61	.29	1.55	0.68, 3.49	.29	1.35	0.73, 2.53	.34
Nicotine presence in Wave 3 (ref. = do not vape)																								
Nicotine-free	78.54	19.92, 309.74	<.01	23.18	4.94, 108.84	<.01	74.53	18.88, 294.26	<.01	19.65	4.07, 94.87	<.01	52.58	12.66, 218.41	<.01	23.56	4.93, 112.55	<.01	46.70	11.08, 196.81	<.01	22.29	4.71, 105.54	<.01
Nicotine present	32.54	10.97, 96.53	<.01	268.37	136.29, 528.43	<.01	31.43	10.61, 93.06	<.01	261.18	132.21, 515.95	<.01	34.52	11.22, 106.18	<.01	313.20	149.31, 656.97	<.01	32.52	10.68, 99.04	<.01	302.66	146.32, 626.05	<.01

Notes: aRR = adjusted risk ratio; 95% CI = 95% confidence interval. Models adjusted for age, current smoking, alcohol consumption, illicit drug use in the past 4 weeks, gambling at least weekly, socio-economic disadvantage, education, CALD status, First Nations status, LGBTQA+ status, region, employment status, relationship status (separated into 'relationship' versus 'no relationship') and the corresponding nicotine presence variable in Wave 3.
Anxiety model, *N* = 4,686; depression model, *N* = 4,677; suicidal thoughts model, *N* = 4,399; suicidal plans model, *N* = 4,421.

Source: TTM data, unweighted, Waves 3 and 4

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