TEN to MEN

The Australian Longitudinal Study on Male Health

INSIGHTS #2 REPORT

Findings from *Ten to Men*: The Australian Longitudinal Study on Male Health, 2013–21

Australian Government
Department of Health and Aged Care

Australian Government
Australian Institute of Family Studies

Ten to Men: The Longitudinal Study on Australian Male Health is conducted in partnership between the Australian Government Department of Health and Aged Care and the Australian Institute of Family Studies (AIFS). The mission of the *Ten to Men* study is to build the evidence base on male health and wellbeing to inform the development of health policy and programs targeted to the changing needs of boys and men.

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Foreword

On behalf of the Australian Institute of Family studies (AIFS), we are pleased to present the *Insights #2 report: Findings from* Ten to Men*: The Australian Longitudinal Study on Male Health*. As its title suggests, this report is uniquely able to provide insights on the life experiences, health and behaviours from the original sample of around 16,000 boys, adolescent males and men using data collected from three 'waves', undertaken during 2013/14, 2015/16 and 2020/21. respectively. This is the first AIFS publication to analyse data from across the first three waves of *Ten to Men*.

Rigorous, detailed information on the health and wellbeing of some Australians across their life course is crucial if we wish to identify causes and impacts of current health and emerging concerns, including risky behaviours. This evidence can inform the timely development of more equitable, inclusive, cost-effective policy and service delivery, which benefits the individual and wider community. In funding *Ten to Men*, the largest active longitudinal study of male health in the world, the Department of Health and Aged Care has made a significant commitment to improving the identification, understanding and prevention of health conditions impacting males of all ages and backgrounds in Australia.

This Insights #2 report includes four empirical chapters detailing findings from the study's rich datasets. Issues include experiences of mental ill-health and associated utilisation of services, participation in gambling and experience of associated harm, use of certain illicit drugs over time, and recent experience of natural disasters. As with the Insights #1 report, we analyse the patterns of different responses to certain environmental circumstances, health conditions and participation in risky behaviours. For example, Medicare Benefits Schedule- and Pharmaceutical Benefits Scheme-funded mental health care tended to be higher among men who were older and less educated. Conversely, recent use of cocaine was more common among younger men and those with higher household incomes.

This report's findings point to opportunities to improve policy and practice. For example, the benefits of developing and implementing holistic prevention and treatment frameworks to address co-occurring gambling, drinking and mental ill-health, rather than treating these behaviours and outcomes in isolation. Disaster planning efforts need to focus on reducing barriers to health care access for disaster-affected men, their families, and communities. Targeted initiatives could increase engagement among men less likely to access mental health services in general, such as younger men and those from culturally and linguistically diverse backgrounds.

This report aims to showcase the power of the *Ten to Men* study to provide crucial information about health conditions affecting Australian males and how they change over time. At the time of writing, Wave 4 of data collection was underway, allowing even greater capacity to identify emerging issues in the post-COVID context and to track established patterns of behaviours and impacts. Longitudinal studies such as *Ten to Men* provide such unique insights that can help design, improve and implement evidence-based responses to health concerns affecting men across the country. This also benefits their families and the wider community.

We are very grateful to the many individuals and organisations across Australia – including the study team, expert advisors, report authors and especially the *Ten to Men* participants – whose valuable time and effort over so many years have made this report possible.

Dr Sharman Stone
AIFS Director

November 2022

Dr Chris Schilling
Research Director (Demographics and Data)

November 2022

Message from the Program Lead

This *Ten to Men* Insights report is AIFS' second instalment in this flagship series, and my first as Program Lead for Australia's longitudinal study on male health and wellbeing. Our Insights series allows us to examine in detail important health issues for boys and men identified in the National Men's Health Strategy 2020–2030 and beyond.

This report is the first publication to incorporate the first three waves of *Ten to Men* – an important milestone that begins to deliver on the original promise of this study to harness the power of longitudinal data to support the development of policy and improve service delivery to benefit the health and wellbeing of Australian boys, men and their families.

I would like to express my immense gratitude to the many individuals and organisations who contributed to the development of this Insights report, and who continue to support us. The Department of Health and Aged Care commissioned and continues to provide guidance and funding for *Ten to Men*. Our Scientific Advisory and Community Reference Groups provide indispensable guidance and expert input. The University of Melbourne coordinated Waves 1 and 2 of *Ten to Men*, and Roy Morgan collected the data at both these time points. The Social Research Centre collected Wave 3 data for AIFS in the midst of a global pandemic. The wonderful group of talented and hardworking AIFS researchers and staff members I'm fortunate to call colleagues – I thank you all!

Finally, I would like to thank every *Ten to Men* participant and their family members. Your invaluable time and enthusiasm enable all that is contained in this report, and all that we plan for in the future.

Dr Sean Martin
Program Lead, Ten to Men*: The Australian Longitudinal Study on Male Health*

November 2022

Introduction

Ten to Men: The Australian Longitudinal Study on Male Health (TTM) is currently the largest longitudinal study of male health in the world. Funded by the federal Department of Health and Aged Care, the study sample comprises over 16,000 males who were aged between 10 and 55 years at Wave 1 of data collection in 2013/14. Two subsequent data collection waves – Waves 2 and 3 – occurred in 2015/16 and 2020/21, respectively.

The broad purpose of TTM is to monitor and collect information on health trends among males in Australia. This information helps improve our understanding of the characteristics and behaviours of Australian males and how certain factors are associated with a range of health outcomes. Government reports, peer-reviewed journal articles, conference presentations and other publications continue to be produced using TTM data and are intended to disseminate findings to a range of audiences, including policy makers, researchers, service providers and the general community. In this context, TTM data and findings can be used to inform appropriate, timely and targeted prevention and education initiatives, in addition to evidence-based policy and practice responses to diverse health issues affecting boys, adolescents and adult men of differing ages, locations and backgrounds across the country.

This Insights #2 report is designed to promote TTM, showcase the breadth of data collected, and disseminate its findings in accessible formats. Above all, it aims to provide a broad overview of the health of males in Australia and highlight specific concerns and trends affecting this group: participation in gambling behaviours, mental ill-health and corresponding service use patterns, use of illicit drugs, and experience of natural disasters.

This report presents data from Waves 1, 2 and 3 of TTM, a period spanning 2013–2021. Using data from the first three waves of data collection for TTM enables the identification and investigation of changes to the health status of males in Australia over time. Further data collection waves will facilitate the identification and monitoring of longer-term trends including transitions in and out of various health states and associated behaviours. This will be invaluable for informing timely, targeted and evidence-based policy and practice to achieve the best health outcomes for males, their families, and the broader Australian community.

The four chapters in this report comprise themes purposely aligned with priority areas in the *National Men's Health Strategy 2020–2030*. The chapters are:

1. *Gambling participation and harm among Australian men*. Using items introduced in the Wave 3 survey of TTM, this chapter investigates the prevalence, frequency and characteristics of gambling participation among Australian men in 2020/21, and associations between 'at-risk or problem gambling' and alcohol and other substance use, mental ill-health and other socio-economic, demographic and behavioural characteristics.
2. *Mental health care needs and access among Australian men: A data linkage study*. This chapter focuses on utilisation of mental health services and pharmaceuticals by Australian men through the Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS), respectively, between 2012 and 2021 and in the context of self-reported experience of depressive symptoms.
3. *Illicit substance use among adult males in Australia, 2013/14–2020/21*. This chapter investigates the prevalence of cannabis, ecstasy, meth/amphetamine and cocaine use among adult Australian males at three time points. The prevalence and frequency of use of a range of other substances such as ketamine, heroin and hallucinogens in 2020/21 is also examined. Additionally, analyses focus on factors associated with past-year cocaine use and the effect of cannabis use on the experience of depressive symptoms over time.
4. *Recent natural disasters in Australia: Exploring the association with men's mental health and access to health care*. Also using items introduced in Wave 3 of TTM data collection, this chapter explores past-year experience of different natural disasters among Australian men, associations with mental ill-health, and mental health service use among men recently affected by natural disasters.

Key measures and data analysis techniques used to address specified objectives are included in each individual chapter. A brief overview of broad statistical methods and terms used in this report is provided in Supplementary material. Information regarding the overall methodology of the TTM study and sample characteristics has been detailed elsewhere (Bandara, Howell, Silbert, & Daraganova, 2021; Currier et al., 2016; Swami et al., 2022).

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Bandara, D., Howell, L., Silbert, M., & Daraganova, G. (2021). Ten to Men*: The Australian Longitudinal Study on Male Health – Data User Guide, Version 4.0, September 2021*. Melbourne: Australian Institute of Family Studies. Retrieved from tentomen.org.au/data-access-and-usage/data-documentation/data-user-guide

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Key findings

Gambling participation and harm among Australian men

- Of Australian men aged 18–63 years, 44% had gambled in the past 12 months in 2020/21.
- One in four men who gambled (around 739,511 Australian men) were classified as being at risk of, or experiencing, problem gambling in the past year. Almost one-quarter (26%) of these men also experienced financial stress during that time.
- Most men who gambled spent money on multiple activities, including horse racing (56%), poker machines (54%) and sports betting (46%).
- Men most frequently gambled on sports betting, horse racing and greyhound racing.
- Engaging in at-risk or problem gambling was significantly associated with:
  - recent financial stress (two times more likely)
  - more frequent gambling (1.71 times more likely) and gambling on a higher number of activities (1.32 times more likely)
  - drinking alcohol at harmful levels in the past year (1.25 times more likely)
  - past-year depression (1.58 times more likely).

Mental health care needs and access among Australian men: A data linkage study

- Around three in 10 Australian men accessed a mental health service at least partly funded by the Medicare Benefits Schedule (MBS) at some point between 2012 and 2021. Almost one in three were prescribed mental health medications at least partly funded by the Pharmaceutical Benefits Scheme (PBS) during the same period.
- The most commonly used MBS-funded mental health service was a mental-health-specific general practitioner (GP) consultation; antidepressants were the most commonly prescribed PBS-funded pharmaceutical for mental health. Use of both these forms of mental health care became more common over time among Australian men.
- The proportion of visits to services that involved no out-of-pocket expenses included 84% of visits to GPs for mental health reasons, 30% of visits to psychiatrists and 50% of visits to psychologists.
- Men's use of MBS- or PBS-funded mental health care differed by socio-economic factors; usage tended to be higher among men who were older, less educated, unemployed or who identified as Aboriginal and/or Torres Strait Islander. These usage differences were more pronounced in mental health prescriptions compared to mental health services.
- Conformity to traditional masculine norms was associated with reduced use of mental health care services among those in need (i.e. those with greater depressive symptoms).
- Rates of mental health service use between March 2020–February 2021, during the COVID-19 pandemic, were similar to pre-COVID levels (January 2018–February 2020); however, 18% of services during COVID-19 were delivered through expanded telehealth measures.

Illicit substance use among adult males in Australia, 2013/14–2020/21

- Prevalence of past-year cocaine use among adult Australian males rose significantly from 4% to 7% between 2013/14 and 2020/21. This change appeared to be driven by an increase in use among younger men (<35 years).
- Prevalence of past-year cannabis, ecstasy and meth/amphetamine use remained relatively stable across the same time period among adult males at 17%, 3%–5% and 3%–4%, respectively.
- Recent use of cocaine among Australian men was associated with younger age, living in major cities (vs non-metropolitan areas) and living in households with greater combined incomes.
- Frequent (weekly or more) cannabis use was associated with higher average depressive symptoms, irrespective of age and related factors, when compared to men who reported no usage in the previous 12 months.

Recent natural disasters in Australia: Exploring the association with men's mental health and access to health care

- One in four Australian men were affected by a natural disaster between July 2019 and February 2021.
- Bushfires were the most prevalent disaster, followed by severe storms.
- Compared to those not affected by a natural disaster, men affected by bushfires were 1.3 times more likely to report moderate or severe depressive symptoms.
- Likewise, men affected by cyclones were 1.6 times more likely to report mild anxiety symptoms and those affected by storms were 1.5 times more likely to report moderate or severe anxiety symptoms.
- Disaster-affected men indicated a higher need for mental health care and significantly more barriers to accessing such health care than those unaffected by disaster.
- Mental health consultations were significantly higher among disaster affected men, with just over 15% of men affected by one natural disaster, and 17% of men affected by two or more natural disasters reporting they had consulted counsellor, psychologist and/or psychiatrist in the previous 12 months.
- Work commitments, a lack of services, cost, long wait times and practices not taking new patients were common reasons why disaster-affected men were unable to access mental health care.

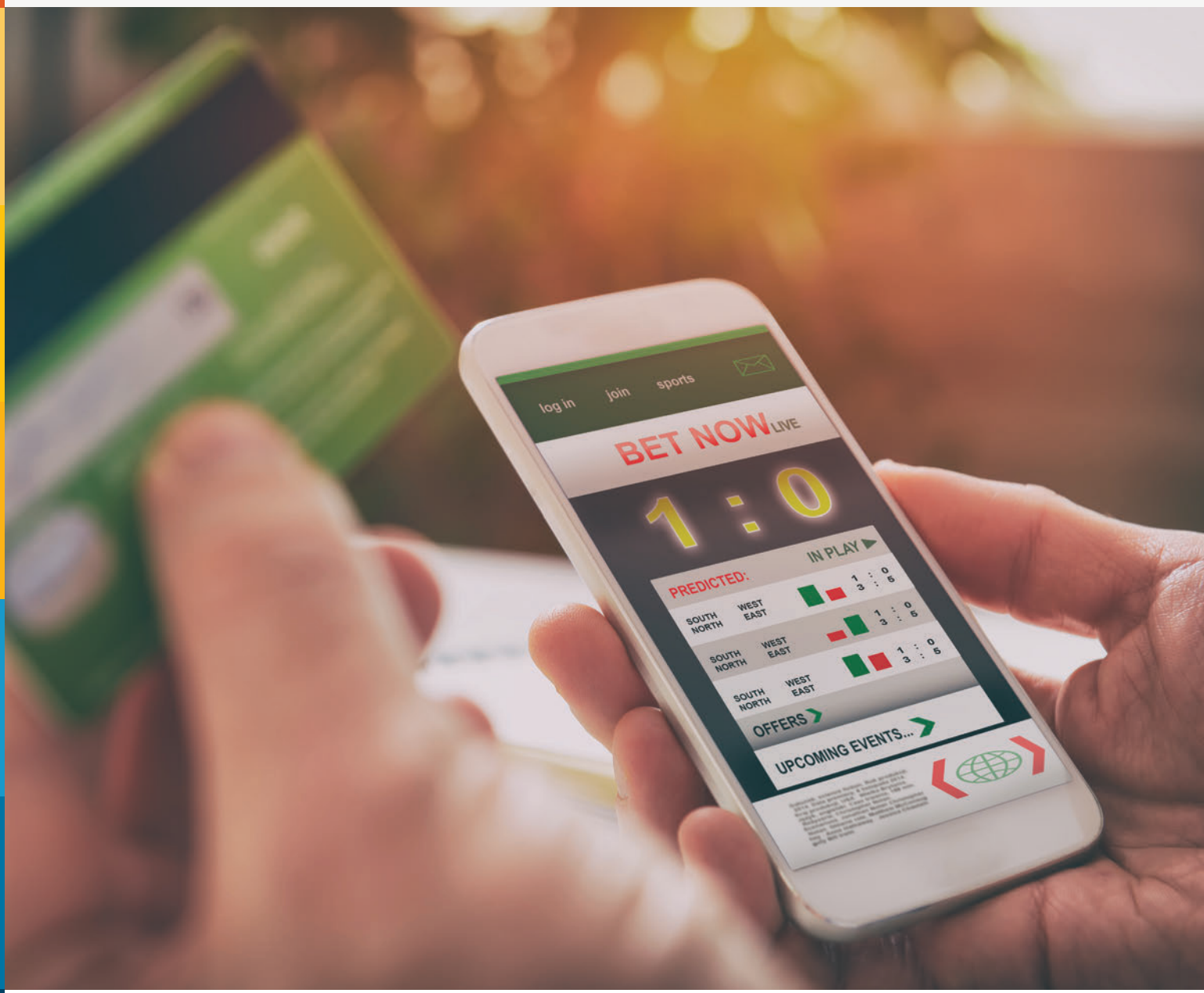
TEN to MEN

The Australian Longitudinal Study on Male Health

Chapter 1

Gambling participation and harm among Australian men

Rukhsana Tajin, Brendan Quinn, Clement Wong, Karlee O'Donnell, Bosco Rowland, Jennifer Prattley and Rebecca Jenkinson



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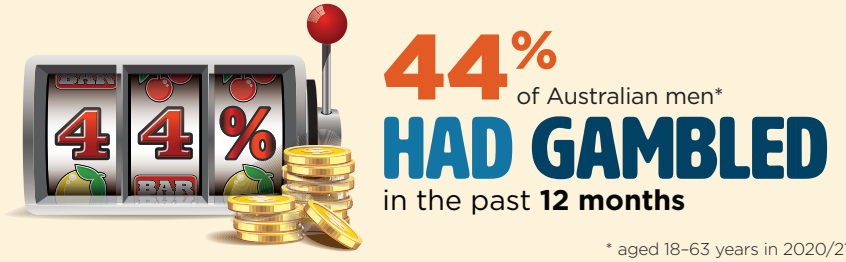
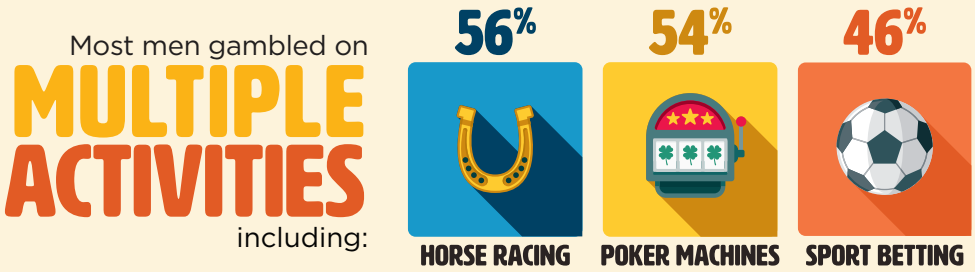
Key messages

- Of Australian men aged 18–63 years, 44% had gambled in the past 12 months in 2020/21.



- One in four men who gambled (around 739,511 Australian men) were classified as being at risk of, or experiencing, problem gambling in the past year. Almost one-quarter (26%) of these men also experienced financial stress during that time.
- Most men who gambled spent money on multiple activities, including horse racing (56%), poker machines (54%) and sports betting (46%).



- Men most frequently gambled on sports betting, horse racing and greyhound racing.
- Engaging in at-risk or problem gambling was significantly associated with:
  - recent financial stress (two times more likely)
  - more frequent gambling (1.71 times more likely) and gambling on a higher number of activities (1.32 times more likely)
  - drinking alcohol at harmful levels in the past year (1.25 times more likely)
  - past-year depression (1.58 times more likely).

Acknowledgements

The authors of this Insights #2 report chapter are extremely grateful to the many individuals and organisations who contributed to its development, and who continue to support and assist in all aspects of the *Ten to Men* study. The Department of Health and Aged Care commissioned and continues to fund *Ten to Men*. The study's Scientific Advisory and Community Reference Groups provide indispensable guidance and expert input. The University of Melbourne coordinated Waves 1 and 2 of *Ten to Men,* and Roy Morgan collected the data at both these time points. The Social Research Centre collected Wave 3 data. A multitude of AIFS staff members collectively work towards the goal of producing high-quality publications of *Ten to Men* findings. We would also especially like to thank every *Ten to Men* participant who has devoted their time and energy to completing study surveys at each data collection wave.

Overview

Gambling is a major public policy issue in Australia, affecting the health and wellbeing of many individuals and families (Australian Institute of Health and Welfare [AIHW], 2021). Gambling-related harms can range from financial, relationship or psychological issues to serious legal or health issues (Murray Boyle, Joshi, & Jenkinson, 2021). Such consequences not only affect the people who gamble but also their families, peers and the wider community (AIHW, 2021). Recent estimates suggest that Australians lose approximately $25 billion on legal forms of gambling every year, representing the largest per capita losses in the world (Queensland Government Statistician's Office, 2021). In Victoria alone in 2014/15, the social costs of gambling, including adverse emotional, psychological, relationship and family wellbeing outcomes, are estimated to be about $7 billion (Browne et al., 2017).

An emerging body of research has examined behavioural and social factors associated with gambling problems. Gambling problems are commonly assessed via the Problem Gambling Severity Index (PGSI) (Ferris & Wynne, 2001). The PGSI provides an indication of 'at-risk' or 'problem' gambling during the previous 12 months; individuals classified as 'at-risk' gamble at a level that can cause adverse consequences. Males, particularly during early adulthood, are more likely to be classified 'at-risk' than other subpopulations, though all demographic groups are exposed to some degree of gambling risk (Browne et al., 2019; Hing, Russel, Vitartas, & Lamont, 2015; Jenkinson, de Lacy-Vawdon, & Carroll, 2018, Jenkinson, Sakata, Khokhar, Tajin, & Jatkar, 2020).

The consumption of alcohol, tobacco and other drugs are among the most common behavioural factors associated with gambling risk. Substance use and symptoms of poor mental health (e.g. depression, anxiety) have been found to be more prevalent among at-risk or problem gambling subpopulations than in the general population. For example, a recent study of Australian university students identified hazardous alcohol use and past-year substance use as significant predictors of problem gambling (Dowling, Aarsman, & Merkouris, 2021). Another study of US adults found problem gambling to be highly correlated with dependence on alcohol, cannabis and tobacco (Barnes, Welte, Tidwell, & Hoffman, 2015). Systematic review findings have also shown that problem gambling rates are generally higher in populations with substance use disorders and other psychiatric diagnoses (Loo, Kraus, & Potenza, 2019).

A number of studies provide evidence to support an increased likelihood of mental health diagnoses and associated behaviours among people gambling at 'at-risk' or 'problem' levels. Men gambling at a risky level are typically at greater risk of these diagnoses and behaviours, which can include depression, obsessive compulsive disorder, alcohol dependence and illicit drug use (Afifi, Nicholson, Martins, & Sareen, 2016; Barnes et al., 2015; Hing, Russell, & Browne, 2017). Similarly, studies on the prevalence of co-morbid psychiatric disorders among gambling treatment-seeking populations have found generally high rates of anxiety disorders, mood disorders and substance use disorders (Dowling et al., 2015; Rodriguez-Monguio, Errea, & Volberg, 2017).

Gambling at a risky level can also impact the financial wellbeing of people who gamble and their family members. Financial harms associated with gambling include reduced funds for essential family expenditures or recreational activities, loss of savings or wealth, debt, circumstances that force people into lowered standards of living, and involvement in illegal activities (Barnard et al., 2014; Mathews & Volberg, 2013).

Despite increasing evidence of co-occurring behaviours and harms among populations of people who gamble, limited research has examined gambling participation and associated harms, including alcohol and other drug use, mental ill-health and experience of financial stress among Australian males at a national level. The *Ten to Men* (TTM) dataset provides a unique opportunity to address this gap.

Research objectives

This chapter of the Insights #2 report used data from TTM to examine:

1. the prevalence, frequency and characteristics of gambling participation among Australian men (aged 18–63) in 2020/21.
2. the prevalence of 'at-risk or problem gambling' ('ARPG') among Australian men who gambled in 2020/21.
3. associations between ARPG and:
   a) alcohol, tobacco and illicit drug use (past and current use; 2013/14–2020/21)
   b) negative mental health experiences (past and current experiences; 2013/14–2020/21)
   c) financial stress (current; 2020/21)
4. socio-demographic, behavioural and mental health predictors of ARPG among Australian men who gambled in the past 12 months in 2020/21.

Method

This section describes the key measures and data analysis techniques used to address the above objectives. Information regarding the overall methodology of the TTM study is detailed elsewhere (e.g. Bandara, Howell, Silbert, & Daraganova, 2021; Swami et al., 2022).

Measures

Gambling

Survey questions regarding gambling participation and experience of at-risk and problem gambling (ARPG) were included for the first time in the Wave 3 (2020/21) survey. Recent (past 12 months) gambling participation was derived from responses regarding frequency of involvement in eight types of gambling activities (see Box 1.2 on page 8); that is, spending money on gambling at least once on any of the activities was coded as '1', and '0' indicated no gambling participation.

Gambling risk was assessed using the nine-item Problem Gambling Severity Index (PGSI; see Box 1.3 on page 10); a score of 1 or more was characterised as 'at-risk or problem gambling', and '0' as non-problem gambling (Ferris & Wynne, 2001).

Mental health and wellbeing

At each of the first three data collection waves, past-year ('recent') experience of both depression and anxiety was captured by asking, 'Have you been treated for or had any symptoms of [condition] in the past 12 months?'.

'Current' depression (past two weeks) was assessed at each wave using the Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001). Based on the total PHQ-9 score (0–27), participants were categorised into either 'moderate to severe' or 'no or mild' depression.

Current anxiety was captured only at Wave 3 using the Generalised Anxiety Disorder-7 scale (GAD-7; Spitzer et al., 2006). In consideration of participants' total GAD-7 score (0–21), they were categorised as experiencing either 'moderate to severe' or 'no or mild' anxiety in the past two weeks.

Life satisfaction was assessed at each wave using the Personal Wellbeing Index (PWI; International Wellbeing Group, 2013).

Alcohol and other substance use

Recent (past year) harmful drinking was measured using the Alcohol Use Disorders Identification Test (AUDIT). See Box 1.1 below for details of alcohol and other drug measures used in this report.

Box 1.1: Surveying TTM participants about harmful or hazardous drinking, illicit drug use and tobacco smoking

Alcohol consumption

At each data collection wave, **harmful or hazardous drinking** among TTM participants was measured using the Alcohol Use Disorders Identification Test (AUDIT). The AUDIT is a 10-item questionnaire used to screen for excessive drinking practices (Babor et al., 2001). It is used widely by health workers and researchers in Australia and internationally. Items assess various components or outcomes of alcohol use including:

- hazardous consumption levels (e.g. 'How often do you have six or more drinks on one occasion?')
- alcohol dependence (e.g. 'How often during the last year have you found that you were not able to stop drinking once you had started?')
- experience of related harms (e.g. 'Have you or someone else been injured as a result of your drinking?').

Total AUDIT scores range from 0–40. Scores of 8 or more indicate harmful/hazardous drinking patterns.[1]

Illicit drug use

TTM participants are asked about their use of different illicit drugs at each data collection wave. In this chapter we only report on past-year ('recent') use of cannabis, meth/amphetamine ('speed' powder, crystal methamphetamine/'ice'), ecstasy and cocaine because these are the four drugs that adult participants were consistently asked about at Waves 1–3.

For comprehensive information about drug use among Australian men using data from the first three waves of TTM data collection, please see chapter 3 of this report.

Smoking status

Adult (18+) participants at each wave were asked if they had ever smoked even part of a cigarette. Those who responded with a 'yes' were further asked, 'Do you currently smoke?' (yes/no). 'Cigarettes' excluded electronic cigarettes, cigars, pipes and cannabis but included filtered, 'light' or 'mild' or roll-your-own cigarettes. In this report chapter, 'smoking' refers to the smoking status at the time of interview for a given wave.

Table S1.1 in the supplementary materials summarises the periods of data collection and the TTM participants surveyed for each of the gambling, substance use and mental health measures included in this report.

Data analysis

TTM participants at Wave 3 were aged 18–63 but the upper age limit for those who gambled was 62; therefore, an age range of 18–62 is used when estimates are presented for only the gambling subpopulation, rather than the entire Wave 3 sample.

For research objectives 1 and 2 (using Wave 3 data), weighted cross-tabulations, Chi-square tests (for categorical variables) and *t*-tests (for continuous variables) were used to examine prevalence estimates and related covariates. To address research objective 3, weighted prevalence (proportions) of alcohol and

1 Alcohol use among Australian males was previously explored in detail – using data only from Waves 1 and 2 – in the Insights #1 report (Quinn, Swami, Terhaag, & Daraganova, G., 2020).

other drug use and experiences of depression and anxiety in Waves 1, 2 and 3 were reported for adult TTM participants (≥18 years) who gambled in 2020/21, along with significant differences between men classified as engaging in gambling at 'non-problem' and 'at-risk or problem gambling' (ARPG) levels.

Two sequential multivariable logistic regression models were developed using Wave 3 data to identify correlates of ARPG (research objective 4). To fit the most parsimonious model, the modelling strategy was as follows: Model 1 was used to identify significant socio-demographic characteristics. These were retained in Model 2, which additionally tested for the effect of financial stress, gambling frequency and number of activities gambled on, substance use, and mental health and wellbeing variables. Among the mental health measures, only past-year depression and past-year anxiety were included in Model 2, as the time frames (past-year) matched that of the gambling risk measure (PGSI).

Findings

Prevalence, frequency and characteristics of gambling participation among Australian men

In 2020/21, 44% of Australian men aged 18–63 reported having gambled in the past 12 months (or an estimated 2,751,934 Australian adult males). The average age of those who had recently gambled was 39 years (*SD* = 12.7) and around 60% were married or lived with a partner (Table 1.1). One-fifth (21%) of men who gambled were born overseas and approximately 4% identified as Aboriginal and/or Torres Strait Islander. Around three-quarters (73%) resided in major cities.

Among men who had recently gambled, most (71%) had completed a post-secondary school qualification; 42% had attained a certificate or diploma, and 29% a university degree. The majority (88%) were employed and almost one-third (30%) had a combined household income of $150,000 or more per annum. More than half (53%) reported a combined household income of $50,000–$149,000.

Compared to adult Australian males who did not gamble in the past 12 months, men who gambled were significantly more likely to be younger, born in Australia, mainly speak English at home and have a higher household income. They were significantly less likely to have a partner, be married or have a university degree. The two groups did not significantly differ in other socio-demographic characteristics.

Table 1.1: Socio-demographic characteristics of men (aged 18–63) based on their gambling status in the past 12 months, 2020/21

Characteristics	% of men who gambled	95% CI	% of men who did not gamble	95% CI
Gambled past 12 months (TTM Wave 3 sample)	**44% of men gambled**		**56% did not gamble**	
Age group (years)**	*N* = 3,339		*N* = 4,306	
18–24	17.1	[14.9, 19.6]	13.5	[11.8, 15.5]
25–34	21.9	[19.6, 24.5]	22.2	[20.1, 24.4]
35–44	24.7	[22.4, 27.1]	21.5	[19.7, 23.5]
45–54	21.7	[19.9, 23.7]	24.4	[22.6, 26.3]
55–63	14.6	[13.1, 16.3]	18.4	[16.8, 20.1]
Aboriginal and/or Torres Strait Islander	*N* = 3,316		*N* = 4,275	
	3.5	[2.5, 4.9]	2.1	[1.4, 3.2]
Born outside Australia***	*N* = 3,316		*N* = 4,278	

Table continued over page →

Characteristics	% of men who gambled	95% CI	% of men who did not gamble	95% CI
Gambled past 12 months (TTM Wave 3 sample)	**44% of men gambled**		**56% did not gamble**	
	20.6	[18.3, 23.1]	28.2	[25.9, 30.5]
Language other than English*	*N* = 3,333		*N* = 4,281	
	6.7	[5.2, 8.7]	9.6	[8.1, 11.5]
State of residence	*N* = 3,221		*N* = 4,143	
New South Wales	34.4	[30.5, 38.4]	29.9	[26.6, 33.5]
Victoria	25.3	[22.1, 28.7]	26.5	[23.3, 30.0]
Queensland	19.1	[16.3, 22.3]	20.0	[17.3, 22.9]
South Australia	6.4	[4.6, 8.9]	7.8	[5.9, 10.3]
Western Australia	9.3	[7.6, 11.5]	10.5	[8.7, 12.8]
Tasmania	2.2	[1.3, 3.6]	2.8	[1.7, 4.6]
Northern Territory	0.9	[0.4, 1.9]	0.5	[0.2, 1.5]
Australian Capital Territory	2.4	[1.4, 4.3]	1.9	[1.1, 3.3]
ASGS region	*N* = 3,155		*N* = 4,038	
Major city	73.3	[71.1, 75.3]	74.9	[72.5, 77.0]
Inner regional	18.2	[16.4, 20.1]	17.6	[15.7, 19.7]
Outer regional	8.5	[7.5, 9.7]	7.5	[6.5, 8.7]
Relationship status**	*N* = 3,262		*N* = 4,207	
Single	21.5	[19.0, 24.2]	22.4	[20.4, 24.7]
In relationship/engaged	15.2	[13.3, 17.3]	10.7	[9.2, 12.4]
Live with partner/married	60.4	[57.6, 63.2]	63.6	[61.1, 66.0]
Widowed/divorced/separated	3.0	[2.3, 3.8]	3.2	[2.5, 4.1]
Highest qualification***	*N* = 3,210		*N* = 4,160	
<Year 12	12.0	[10.2, 14.0]	9.5	[8.1, 11.2]
Year 12 or equiv.	17.4	[15.3, 19.7]	16.2	[14.4, 18.3]
Cert/diploma/other	41.7	[39, 44.4]	38.4	[36.0, 40.8]
Bachelor or higher	28.9	[26.5, 31.6]	35.9	[33.6, 38.3]
Employment status	*N* = 3,226		*N* = 4,163	
Employed	88.1	[86.0, 89.9]	84.9	[82.9, 86.6]
Unemployed and looking for work	6.3	[4.9, 8.0]	7.7	[6.5, 9.1]
Out of labour force	5.6	[4.5, 7.1]	7.4	[6.2, 8.9]
Annual combined household income*	*N* = 2,999		*N* = 3,790	
$200,000+	16.0	[14.1, 18.1]	14.4	[12.8, 16.2]
$150,000–$199,999	14.3	[12.5, 16.3]	14.0	[12.5, 15.8]
$100,000–$149,000	27.4	[25.0, 30.1]	24.2	[22.0, 26.4]
$50,000–$99,999	26.0	[23.6, 28.6]	27.4	[25.2, 29.7]
$49,999 or less	16.2	[14.1, 18.6]	20.0	[17.9, 22.2]

Notes: *N* > 2,999; ASGS = Australian Statistical Geography Standard; CI = confidence interval. Significant differences between the gambling and non-gambling groups at three alpha levels are noted by: *$p < .05$, **$p < .01$, ***$p < .001$.

Source: TTM data, Wave 3, adult cohort, weighted

Box 1.2: Participation in, and frequency of, gambling activities measured in the Wave 3 TTM survey

Gambling is an activity where a person places a 'stake' (i.e. money or other items of value) on a chance or mixed chance/skill outcome in the hope of winning a prize (i.e. money or something of monetary value) (*Gambling Regulation Act 2003*). In this chapter, 'gambling' refers to spending money on land-based products – for example, 'pokies' – or online gambling, not on gambling informally with friends.

At Wave 3 (2020/21) of TTM, participants were asked about how often they spent money on eight different gambling activities in the past year:

Activities

Horse racing, poker machines, sports betting, greyhound racing, casino table games, poker, esports betting, fantasy sports betting.

Frequency of participation

TTM participants were asked to specify how often they had spent money on each activity in the past year: 1) never, 2) once or twice, 3) a few times, 4) once a month, 5) 2–3 times a month, 6) once a week, 7) 2–3 times a week, and 8) 4 or more times a week.

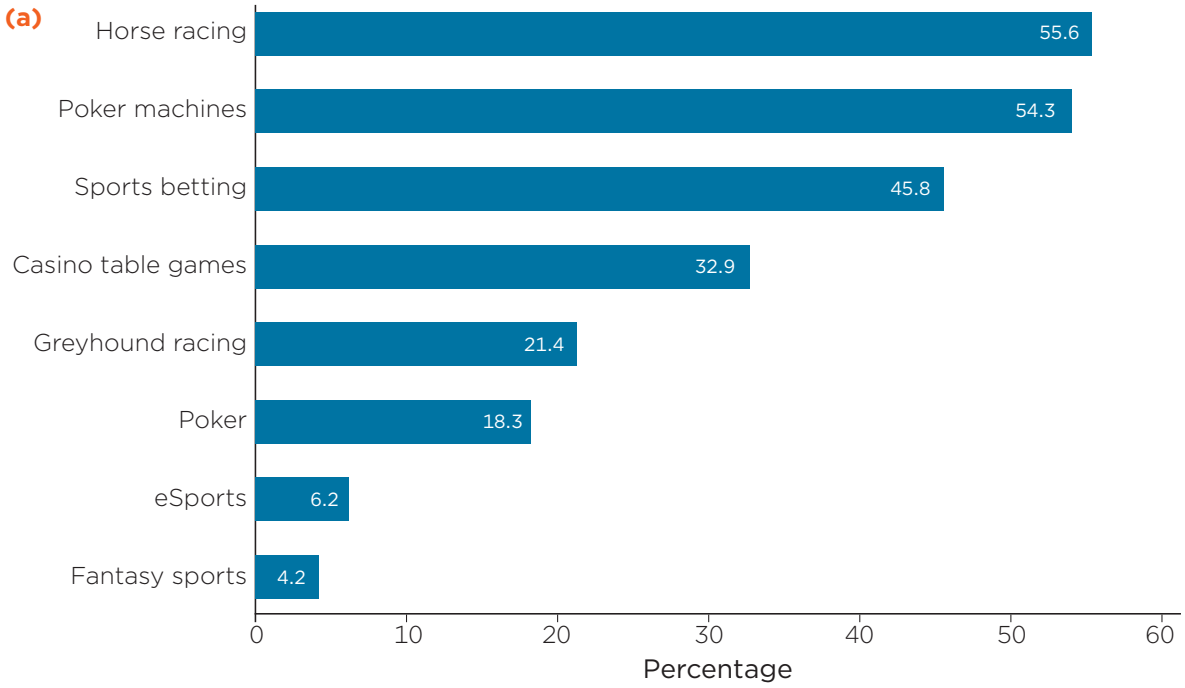
The prevalence and frequency of participation in eight different types of gambling activities (see Box 1.2) among adult Australian males in 2020/21 are shown in Figures 1.1a and 1.1b, respectively. The most common activities that men recently gambled on were horse racing (56%), poker machines (54%) and sports betting (46%) (Figure 1.1a). Most men who gambled (60%) spent money on multiple gambling activities (two activities on average); about one-quarter (23%) spent money on two activities, 15% on three, and 22% on four or more gambling activities.

Regarding gambling frequency, differences were observed when examined by type of activity (Figure 1.1b).[2] Adult men gambled most frequently on sports and horse and greyhound racing during the past 12 months, and least frequently on pokies, poker and casino table games.

Differences in the average age of men who gambled were observed for different gambling activities. Men who spent money gambling on horse racing (avg. age = 41 years), sports betting and poker machines (avg. age = 39 years, each) tended to be older than men who gambled on esports and fantasy sports (32 and 33 years, respectively).

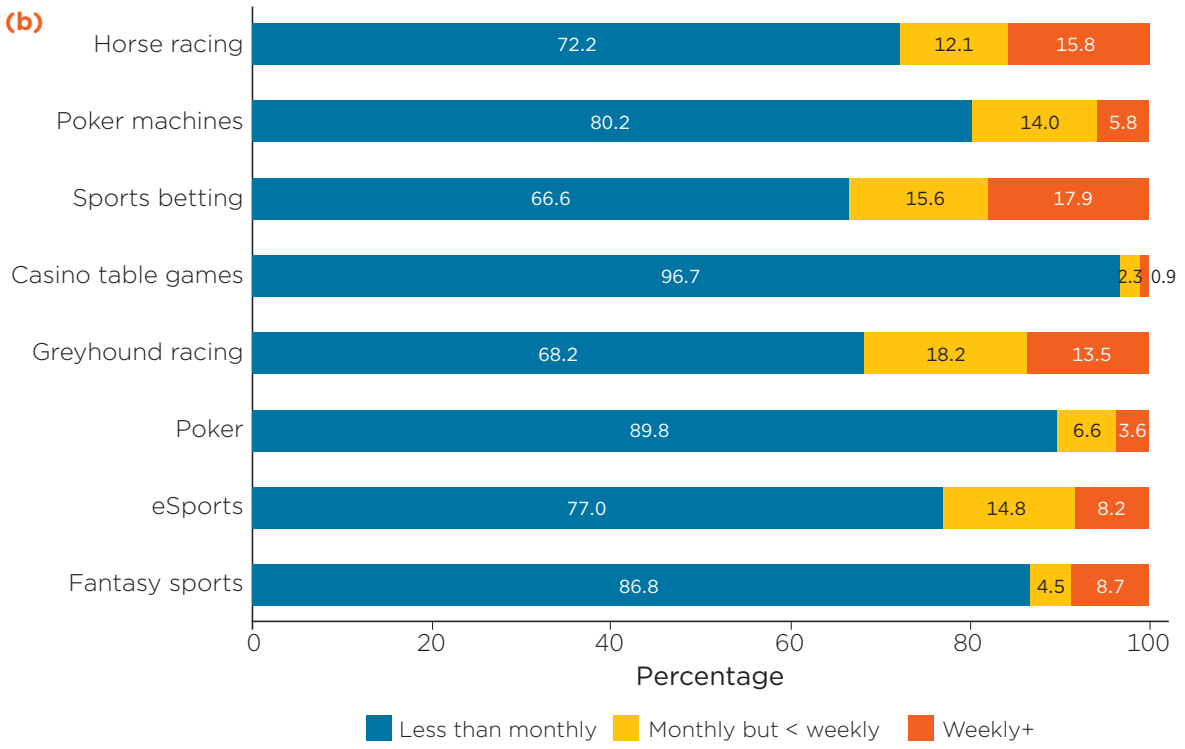
2 Derived from original frequency variables (Box 1.2).

Figure 1.1: Estimated prevalence (%) of a) participation in gambling activities among adult Australian men (18–62[3] years) and b) frequency of participation by gambling activity type among men who gambled in the past 12 months, 2020/21



Notes: *N* = 3,339; Estimated prevalence for an activity does not represent sole participation in that activity.

Source: TTM data, Wave 3, adult cohort, weighted



Notes: Horse racing (*N* = 2,036), poker machines (*N* = 1,666), sports betting (*N* = 1,473), casino table games (*N* = 973), greyhound racing (*N* = 728), poker (*N* = 496), esports (*N* = 129) and fantasy sports (*N* = 110).

Source: TTM data, Wave 3, adult cohort, weighted

3 TTM participants at Wave 3 were aged 18–63 but the upper age limit for those who gambled was 62. Therefore, an age range of 18–62 is used when estimates are presented for only the gambling subpopulation, rather than the entire Wave 3 sample.

Box 1.3: Measuring gambling-related harms: the Problem Gambling Severity Index (PGSI)

The PGSI consists of the following nine items (questions) relating to gambling behaviour in the past 12 months, with response options being never (coded as 0), sometimes (1), most of the time (2) and almost always (3):

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

Individual item scores are summed to achieve a total score ranging between 0 and 27. Respondents are grouped into four categories based on their total scores: non-problem gamblers (0), low-risk gamblers (1–2), moderate-risk gamblers (3–7), and problem gamblers (8–27). Respondents who score 1+ may be classified as being at some risk of, or already experiencing, gambling-related problems. As mentioned earlier, we refer to this group as at-risk or problem gamblers (ARPG) throughout this report.

Prevalence of 'at-risk or problem gambling' (ARPG) among Australian men who gamble

Experience of gambling-related problems is commonly assessed via the Problem Gambling Severity Index (PGSI) (Ferris & Wynne, 2001). As detailed in Box 1.3, the PGSI provides a measure of 'problem' or 'at-risk' gambling during the previous 12-month period. TTM participants who had spent money on any of eight gambling activities in the past year (see Box 1.2) were categorised as engaging in either non-problem gambling, low-risk gambling, moderate-risk gambling or problem/high-risk gambling.

In 2020/21, more than one-quarter (27%) of adult Australian males who gambled in the past 12 months, equivalent to around 739,511 men, were classified as being at some risk of experiencing gambling problems/harms (Table 1.2). The estimated prevalence rates for the three risk categories for Australian men who had recently gambled were: low-risk (17%), moderate-risk (7%) and high-risk/problem gambling (3%). Among men who had recently engaged in specific types of gambling activities, 38% of those who engaged in sports betting were categorised as ARPG, as were 33% of those who used pokies and 31% of those who bet on horse races.

Table 1.2: PGSI risk categories for men (18–62 years) who gambled in the past 12 months, 2020/21

PGSI risk group	*n*	% of men who gambled	[95% CI]
Non-problem gambling	2,505	72.9	[70.3, 75.4]
Low risk	491	16.7	[14.8, 18.9]
Moderate risk	247	7.3	[5.9, 9.0]
High risk or problem gambling	81	3.1	[2.2, 4.3]
ARPG	**819**	**27.1**	**[24.6, 29.7]**

Notes: *N* = 3,324. TTM participants without valid responses to the PGSI items were excluded from analyses (*n* = 15); ARPG = at-risk or problem gambling; CI = confidence interval; PGSI = Problem Gambling Severity Index

Source: TTM data, Wave 3, adult cohort, weighted

Associations between ARPG and behavioural, health and financial factors

Alcohol, tobacco and illicit drug use

This section examines patterns of alcohol and other drug use across the first three TTM waves (2013/14, 2015/16 and 2020/21) among Australian males classified as ARPG in 2020/21 (Wave 3 of TTM).

Analyses focused on recent (past year) harmful drinking, measured by the AUDIT (see Box 1.1), recent use of four key illicit drugs – cocaine, ecstasy, cannabis and meth/amphetamine, and tobacco smoking status (Box 1.1), for each of the three waves. Estimates in Table 1.3 are for adult Australian males (18 years or over) from each of the three time points of TTM data collection.[4]

Table 1.3: Past year prevalence (%) of cocaine, ecstasy, cannabis and meth/amphetamine use and harmful drinking behaviours among men who gamble, by their ARPG status, 2013/14, 2015/16 and 2020/21

Substance	2013/14		2015/16		2020/21	
	% of ARPG	% of non-problem	% of ARPG	% of non-problem	% of ARPG	% of non-problem
Any substance (excl. smoking) (ARPG *N* = 676, Non-problem *N* = 2,210)	58.6**	49.6	58.2**	47.3	63.6***	48.8
Harmful drinking (ARPG *N* = 492, Non-problem *N* = 1,599)	55.5*	45.8	53.5**	41.9	54.8***	40.9
Any illicit drugs (At-risk *N* = 588, Non-problem *N* = 1,948)	30.7*	23.2	35.6**	25.5	38.4***	25.8
Cannabis (ARPG *N* = 583, Non-problem *N* = 1,957)	27.6*	21.3	29.3*	21.6	28.1*	20.3
Cocaine (ARPG *N* = 657, Non-problem *N* = 2,153)	6.4	4.7	9.3	6.9	14.8**	8.8
Ecstasy (ARPG *N* = 658, Non-problem *N* = 2,145)	7.4	4.6	11.0	6.7	9.4* [a]	5.2
Meth/amphetamine (ARPG *N* = 506, Non-problem *N* = 1,777)	7.6**	3.1	14.8***	4.1	12.4***	3.1
Smoking (ARPG *N* = 403, Non-problem *N* = 1,304)	37.0**	26.5	38.1**	26.6	33.8**	22.8

Notes: ARPG = at-risk or problem gambling; CI = confidence interval. Asterisks (*) denote significant differences between at-risk/problem gambling (ARPG) and non-problem gambling groups in the corresponding wave, *$p < .05$, **$p < .01$, ***$p < .001$. Chi-square tests were used for significance testing. 'Any illicit' was derived from cannabis, cocaine, meth/amphetamine and ecstasy variables, coded '1' if used any of these substances, and '0' if a participant nominated 'no' for one or more of these substances and had missing data for the rest. 'Any substance' was derived from harmful drinking and 'any illicit' variables, coded '1' if used any of these substances, and '0' if a participant nominated 'no' for one or more of these substances and had missing data for the rest. [a] $p = .0463$, which rounds to .05.

Source: TTM data, Waves 1, 2 and 3, adult cohort, weighted; includes adults (aged 18+) at W1 who gambled at W3. Balanced data for each row; i.e. each row only includes data from participants with valid data for both the PGSI and the substance in that particular row for all three waves.

Among Australian men classified as engaging in ARPG, the prevalence of any substance (alcohol and illicit drugs) use increased between 2013/14 and 2020/21 (59% to 64%). More than half of men in the ARPG group (54% to 56%) drank alcohol at a harmful or hazardous level in each of the three time points. The prevalence of illicit drug use among the ARPG group also increased significantly from 31% in 2013/14 to 38% in 2020/21.

More specifically, among men engaging in ARPG, recent use of cocaine increased more than twofold from 6% in 2013/14 to 15% in 2020/21. Between 2013 and 2016, meth/amphetamine use almost doubled (8% to

4 Confidence intervals for the estimates reported in Table 1.3 can be found in Supplementary Materials Table S1.2.

15%) and ecstasy use increased (7% to 11%) among this group, before recent use of both drugs reduced in 2020/21 (albeit levels remained higher than those recorded in 2013/14). In comparison, harmful drinking and cannabis use remained relatively stable, whereas tobacco smoking decreased slightly (37% to 34%) between 2013/14 and 2020/21; almost similar patterns were observed for the non-problem gambling group in relation to the use of alcohol, cannabis and tobacco (Table 1.3).

Adult males who were classified as ARPG in 2020/21 were significantly more likely to have drunk alcohol at harmful levels, used some illicit substances and to have smoked tobacco in 2013/14, 2015/16 and 2020/21, in comparison with men who gambled at non-problem levels. Across the three time points, rates of any substance use ranged between 58% and 64% for the ARPG group, compared to between 47% and 50% for men classified as engaging in non-problem gambling (Table 1.3). For meth/amphetamine use, the estimated rates for the ARPG and non-problem gambling participants were 8%–15% and 3%–4%, respectively. The only exceptions were cocaine and ecstasy use at Waves 1 and 2 where there was no difference in use between ARPG and non-problem groups.

Mental health and wellbeing

This section investigates the prevalence of depression and anxiety and levels of life satisfaction (personal wellbeing) across 2013/14–2020/21 among Australian men who had recently gambled in 2020/21 and were classified as either ARPG or in the non-problem gambling group. Experience of both depression and anxiety were assessed for two time periods; past-year ('recent') and past two weeks ('current').

Across all three time points, a significantly higher proportion of men engaging in ARPG were estimated to have experienced recent (past 12 months) and current (past two weeks) depression and anxiety than men in the non-problem gambling group, with the only exception observed for recent anxiety in 2020/21 (Table 1.4). For example, in 2020/21, 16% of ARPG men experienced recent depression (vs 9% of non-problem), 21% experienced moderate to severe current depression (vs 12% of non-problem), and 13% reported moderate to severe current anxiety in the past two weeks (vs 8% of non-problem) (Table 1.4).

Table 1.4: Mental health and wellbeing of men (18–62 years) who gambled across three waves, 2013/14, 2015/16 and 2020/21

Condition	2013/14		2015/16		2020/21	
	Among ARPG %	Among non-problem gamblers %	Among ARPG %	Among non-problem gamblers %	Among ARPG %	Among non-problem gamblers %
Past-year depression (At-risk *N* = 712, Non-problem *N* = 2,250)	15.7***	9.3	19.8***	10.5	16.1***	8.9
Moderate to severe depression (PHQ-9) (At-risk *N* = 715, Non-problem *N* = 2,223)	16.1***	8.8	16.6**	10.1	20.6***	11.5
Past-year anxiety (At-risk *N* = 714, Non-problem *N* = 2,243)	10.4**	5.8	11.8**	6.3	8.1	7.2
Moderate to severe anxiety (GAD-7) [a] (At-risk *N* = 805, Non-problem *N* = 2,479)	-	-	-	-	12.8**	7.6

Notes: [a] Not assessed at Waves 1 and 2 of TTM; ARPG = at-risk or problem gambling; CI = confidence interval. Asterisks (*) denote significant differences between at-risk/problem and non-problem gambling groups, *$p < .05$, **$p < .01$, ***$p < .001$. Chi-square tests were used for significance testing.

Source: TTM data, Waves 1, 2 and 3, adult cohort; men who had recently gambled at W3, weighted. Balanced data for each row, i.e. cases who had gambled at W3 and had valid data for all three waves

Although significantly more men who were classified as engaging in ARPG experienced depression and anxiety compared to the non-problem group at each time point, the prevalence within an individual group remained relatively stable across the three time points between 2013 to 2021. For example, prevalences of past-year depression were 16%, 20% and 16% among the ARPG group, and 9%, 11% and 9% among the non-problem gambling group in 2013/14, 2015/16 and 2020/21 respectively.

Average levels of life satisfaction, measured using the PWI, are reported for adult men based on their at-risk or problem gambling status at 2020/21 in Table 1.5. For all time points, men classified as ARPG reported significantly lower life satisfaction (i.e. lower average PWI scores) compared to the non-problem gambling group; a score of 67 versus 72 in 2013/14, 66 versus 70 in 2015/16, and 65 versus 72 in 2020/21.

Table 1.5: Life satisfaction (Personal Wellbeing Index) at 2013/14, 2015/16 and 2020/21 among men who had recently gambled in 2020/21

Time point	Mean PWI score [95% CI]			
	ARPG gamblers (*N* = 646)		Non-problem gamblers (*N* = 2,104)	
2013/14	67.0***	[65.1, 69.0]	72.4	[71.4, 73.2]
2015/16	65.8***	[63.8, 67.7]	70.3	[69.4, 71.3]
2020/21	65.3***	[63.2, 67.5]	72.2	[71.2, 73.2]

Notes: ARPG = at-risk or problem gambling; CI = confidence interval. Asterisks (*) denote significant differences between at-risk and non-problem gambling groups, *$p < .05$, **$p < .01$, ***$p < .001$. Independent sample t-tests were used for significance testing.

Source: TTM data, Waves 1, 2 and 3; adults (aged 18+) at W3, weighted. Balanced data for each row, i.e. cases who had gambled at Wave 3 and had valid PWI data for all three waves. PWI asked of adults only.

Experience of financial stress

At Wave 3, TTM participants were asked whether they had experienced different forms of financial stress (multiple-choice items listed in Box 1.4) due to a shortage of money in the past 12 months. Findings are presented in Table 1.6. Similar proportions of men who had recently gambled (18%) and had not recently gambled (19%) reported having experienced at least one type of financial stress in the past 12 months; the two groups did not differ significantly on prevalence of any individual financial stress items (Table 1.6).

However, men classified as ARPG differed significantly to the non-problem gambling population on five of the six financial stress measures (see asterisks (*) in Table 1.6). For example, a significantly higher proportion of ARPG gamblers (26%) experienced financial stress, compared to participants classified as in the non-problem gambling group (15%). Almost one in five (18%) men who were classified as gambling at a risky or problematic level requested financial help from friends or family, 8% could not get medical care, 7% could not pay mortgage/rent on time, and 6% could not fill/collect prescription due to a shortage of money in the past 12 months (Table 1.6).

Box 1.4: Financial stress caused by a shortage of money in the past 12 months, 2020/21

At Wave 3, TTM participants were asked, 'Over the past 12 months did any of the following happen to you because of a shortage of money?' ('Yes' or 'No')?

- Could not fill or collect a prescription medicine
- Could not get a medical test, treatment or follow-up that was recommended by a doctor
- Could not go to the doctor when you needed to
- Could not afford to heat your home
- Could not pay electricity, gas or telephone bills on time
- Could not pay the mortgage or rent on time
- Asked for financial help from friends or family

A binary variable indicating recent experience of 'Any financial stress' (yes/no) was derived from the above items; those who selected 'yes' for at least one of these items received a 1 ('yes'); '0' otherwise.

Table 1.6: Financial stress experienced by men in the past 12 months, by gambling status and at-risk or problem gambling (ARPG) status, 2020/21

Financial stress	By gambling status		By ARPG status	
	% of men who gambled [95% CI]	% of men who didn't gamble [95% CI]	% of ARPG men [95% CI]	% of non-problem gambling men [95% CI]
Any financial stress	17.8 [15.7, 20.1]	18.5 [16.7, 20.4]	25.8*** [21.2,31.0]	15.0 [12.7, 17.6]
Asked for financial help	10.2 [8.6, 12.1]	9.7 [8.4, 11.1]	17.6*** [13.8,22.2]	7.5 [5.9, 10.0]
Could not pay bills on time	7.1 [5.8, 8.6]	7.1 [6.1, 8.3]	8.5 [6.0,12.0]	6.6 [5.2, 8.3]
Could not get medical care	5.1 [4.0,6.5]	5.8 [4.7, 7.2]	8.2** [5.6,11.8]	4.0 [2.9, 5.4]
Could not pay mortgage/rent on time	4.8 [3.6,6.2]	4.0 [3.2, 4.9]	7.4* [4.9,11.1]	3.8 [2.7, 5.5]
Could not fill/collect prescription	3.8 [2.8,5.1]	4.2 [3,3. 5.4]	6.4** [4.1,10.0]	2.8 [1.9, 4.2]

Notes: ARPG = at-risk or problem gambling; *N* varies between columns due to varying degrees of missingness. *N* is between 3,225 and 3,235 for men who gambled, 4,164 and 4,180 for men who didn't gamble, 785 and 790 for ARRG men, and 2,428 and 2,431 for non-problem gambling men. The item 'could not afford to heat your home' was not reported due to low prevalence among people who gamble (n = 29); CI = confidence interval; *p < .05, **p < .01, ***p < .001. Chi-square tests were used for significance testing.

Source: TTM data, Wave 3, adult cohort, weighted

Multivariable analysis: Factors independently associated with at-risk or problem gambling (ARPG)

A multivariable logistic regression model (Model 1; supplementary materials Table S1.4) was developed to identify significant socio-demographic correlates of ARPG in 2020/21 ('yes' or 'no'). Protective factors for at-risk or problem gambling included having a partner, being employed, having a university degree (reference = less than year 12) and earning a combined household income of $200,000 or more (reference = less than $50,000). The odds of ARPG were 59% higher (aOR = 1.59) among men aged 18–24 and 51% higher (aOR = 1.51) among men aged 25–34, compared to those aged 55 years or over.

Socio-demographic factors that were not significantly correlated with ARGP included Aboriginal and Torres Strait Islander identity, country of birth (Australia vs elsewhere), CALD status and residential location (major cities vs inner and outer regional areas) (supplementary materials Table S1.4).

Significant socio-demographic correlates of ARPG in Model 1 were then entered into a second logistic regression model (Model 2) with gambling behaviour (gambling frequency and number of activities), substance use (past-year harmful drinking and illicit drug use), mental ill-health (past-year depression and anxiety), and past-year experience of financial stress.

In Model 2 (Table 1.7), having experienced any financial stress had the highest positive association with gambling at a risky/problematic level in the past 12 months; men who had recently experienced financial stress had around double the odds of engaging in ARPG (aOR = 1.97, 95% CI [1.50–2.58]). In addition, more frequent gambling (aOR = 1.72, 95% CI: 1.61–1.82), gambling on a higher number of activities (aOR = 1.32, 95% CI [1.23–1.42]), past-year harmful drinking (aOR = 1.25, 95% CI [1.01–1.54]), and past-year depression (aOR = 1.58, 95% CI [1.09–2.31]) remained correlated with risky/problematic gambling in the past year (Table 1.7). Having a partner remained protective for ARPG in this analysis (aOR = 0.64, 95% CI [0.49–0.84]).

Table 1.7: Multivariable Model 2: Predictors of at-risk gambling among Australian men (18–62 years) who gambled in the past 12 months, 2020/21

Characteristics	aOR	SE	95% CI
Age (ref. = 55–63)			
18–24	1.20	0.26	[0.78, 1.84]
25–34	1.40	0.26	[0.98, 2.03]
35–44	1.22	0.20	[0.88, 1.69]
45–54	1.19	0.18	[0.88, 1.61]
Partnered (ref. = no)	0.64**	0.09	[0.49, 0.84]
Highest qualification (ref. = less than year 12)			
Year 12 or equivalent	1.36	0.28	[0.90, 2.05]
Cert./diploma/other	0.96	0.17	[0.68, 1.36]
Bachelor or higher	1.21	0.23	[0.83, 1.77]
Employed (ref. = no)	0.78	0.15	[0.54, 1.13]
Annual combined household income (ref. = less than $50,000)			
$200,000 or more	0.65*	0.14	[0.43, 0.99]
$150,000–$199,999	1.00	0.21	[0.67, 1.53]
$100,000–$149,1000	0.80	0.15	[0.56, 1.16]
$50,000–$99,999	0.80	0.14	[0.56, 1.14]
Harmful drinking (ref. = no)	1.25*	0.13	[1.01, 1.54]
Illicit drugs (ref. = no)	1.12	0.14	[0.87, 1.43]
Currently smoking (ref. = no)	1.14	0.16	[0.86, 1.50]
Past 12-month depression (ref. = no)	1.58*	0.30	[1.09, 2.31]
Past 12-month anxiety (ref. = no)	0.91	0.20	[0.59, 1.40]
Financial stress (ref. = no)	1.97***	0.27	[1.50, 2.58]
Number of gambling activities	1.32***	0.05	[1.23, 1.42]
Overall gambling frequency	1.72***	0.05	[1.61, 1.82]
Constant	0.04***	0.01	[0.03, 0.08]

Notes: *N* = 2,864; aOR = adjusted odds ratio; CI = confidence interval; *$p < .05$, **$p < .01$, ***$p < .001$. Model tested for multicollinearity with mean Variance Inflation Factor (VIF) of 1.77 and maximum 3.11, indicating a low correlation among predictors.

Source: TTM data, Wave 3, adult cohort, unweighted

Summary

This is the first national study of Australian men to examine gambling behaviour and associated harms. Using data from Wave 3 of TTM, this report chapter examined the prevalence and frequency of gambling participation, the socio-demographic characteristics of men who gamble, risks of experiencing gambling problems, and financial stress experienced by adult men in Australia in 2020/21. It also compared the prevalence of alcohol and other drug use and mental ill-health experienced by men classified as ARPG and those gambling at non-problem levels in 2020/21, for the period 2013/14–2020/21.

Findings suggest that, in 2020/21, an estimated 2,751,934 adult Australian males aged 18–62 had gambled in the past 12 months, most commonly on horse racing, poker machines and sports betting. In 2020/21, 27% of men who gambled were classified as being at-risk of problem gambling in the past year, of which almost one-quarter (26%) also experienced some form of financial stress during that time. Significant predictors of ARPG in the past year included not having a partner, more frequent gambling and gambling on a higher number of activities, drinking alcohol at harmful levels, experience of depression and financial stress.

The findings of this research support the existing literature on the co-occurrence of gambling and other risky behaviours (Barnes et al., 2015; Loo et al., 2019). For example, Díaz and Pérez (2021) observed that people who drank alcohol and/or smoked tobacco were more likely to gamble and to spend greater amounts of money on gambling activities. In another recent study of Swedish adults who gambled, participants classified as engaging in problem gambling were significantly more likely to 'smoke or take snuff daily' and to have used an illegal or prescribed drug for non-medical purposes in the past year (Ford & Hakansson, 2020).

The literature also suggests two-way associations between exposure to alcohol and other drug consumption and mental ill-health during childhood or adolescence and gambling problems in later years. In a multi-wave Australian cohort study, binge drinking and tobacco use in young adulthood were found to predict adult gambling (Merkouris et al., 2021). Similarly, a 2017 systemic review and meta-analysis of longitudinal studies examined early risk and protective factors for problem gambling in adulthood and found that problem gambling was associated with alcohol use frequency, tobacco and illicit drug use and depressive symptoms encountered in childhood though to young adulthood (Dowling et al., 2017). Related research found that 'at-risk' or 'problem' gambling in early adulthood predicted poor mental health and the onset of substance use disorders in later years (Afifi et al., 2016).

Our findings of an association between at-risk or problem gambling and financial stress are also supported by the relevant literature. For example, in an observational study of financial records of 6.5 million individuals spanning over seven years, Muggleton and colleagues (2021) found that gambling was not only related to higher financial distress but also predicted future unemployment and decay of quality of life.

It is worth noting that TTM Wave 3 data collection (July 2020–January 2021) partially coincided with COVID-19 pandemic restrictions in Australia when some land-based (e.g. 'pokies') gambling venues were closed and major sporting/racing events were postponed or cancelled. Our findings of past-year prevalence for horse racing (56%) and sports betting (46%) among adult men in 2020/21 were comparable to what was found for the pre-pandemic period (57% and 46%, respectively) in another Australian study conducted during June–July 2020 of adults who gambled in the past year (Jenkinson et al., 2020). However, the prevalence of gambling on poker machines in the current study (54%) is higher than that observed in the other Australian study (35%). This difference could be explained by the different sampling strategies or time frames examined in the two studies.

Findings from the current study of Australian men support a range of policy and practical initiatives, including the need to develop and implement holistic prevention and treatment frameworks to address co-occurring gambling, drinking and mental ill-health, rather than treating these behaviours and outcomes in isolation. Other strategies recommended to help minimise gambling-related health, social and economic harms to affected individuals and communities include measures such as limiting the availability of gambling marketing and promotions (especially related to sports and race betting), reducing the number of poker machines in venues and restricting operating hours, implementing online and land-based

gambling pre-commitment systems and effective self-exclusion programs, and developing a National Gambling Strategy (similar to Australia's National Alcohol Strategy) (e.g. Jenkinson et al., 2020).

The gambling module in the Wave 3 TTM Survey provided a unique opportunity to examine gambling participation and related harm among Australian men. The findings presented in this report will help to inform future research and policy development, and future waves of TTM will provide opportunities to explore changes in gambling behaviours and related harm over time.

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TEN to MEN

The Australian Longitudinal Study on Male Health

Chapter 2

Mental health care needs and access among Australian men: A data linkage study

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Key messages

- Around three in 10 Australian men accessed a mental health service at least partly funded by the Medicare Benefits Schedule (MBS) at some point between 2012 and 2021. Almost one in three were prescribed mental health medications at least partly funded by the Pharmaceutical Benefits Scheme (PBS) during the same period.

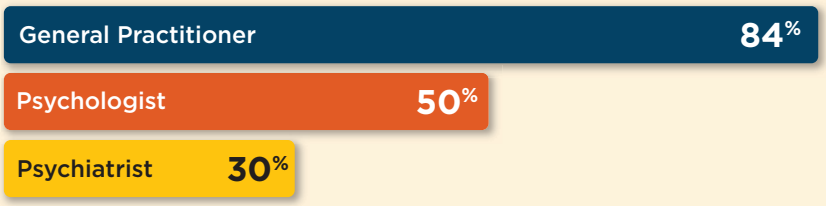
3 in 10 men accessed a
MENTAL HEALTH SERVICE
at least ***partly funded*** by the **Medicare Benefits Schedule (MBS)***

1 in 3 were prescribed
MENTAL HEALTH MEDICATIONS
at least ***partly funded*** by the **Pharmaceutical Benefits Scheme (PBS)***

*at some point between 2012 and 2021

- The most commonly used MBS-funded mental health service was a mental-health-specific general practitioner (GP) consultation; antidepressants were the most commonly prescribed PBS-funded pharmaceutical for mental health. Use of both these forms of mental health care became more common over time among Australian men.
- The proportion of visits to services that involved no out-of-pocket expenses included 84% of visits to GPs for mental health reasons, 30% of visits to psychiatrists and 50% of visits to psychologists.

Mental health service visits that involved
NO OUT-OF-POCKET EXPENSES



- Men's use of MBS- or PBS-funded mental health care differed by socio-economic factors; usage tended to be higher among men who were older, less educated, unemployed or who identified as Aboriginal and/or Torres Strait Islander. These usage differences were more pronounced in mental health prescriptions compared to mental health services.
- Conformity to traditional masculine norms was associated with reduced use of mental health care services among those in need (i.e. those with greater depressive symptoms).
- Rates of mental health service use between March 2020–February 2021, during the COVID-19 pandemic, were similar to pre-COVID levels (January 2018–February 2020); however, 18% of services during COVID-19 were delivered through expanded telehealth measures.

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Overview

Men's mental health remains a significant public health concern and a priority issue for Australia. In 2020–21, 7.8% of Australian men were estimated to have depression or feelings of depression while slightly more (10.6%) had an anxiety-related condition (Australian Bureau of Statistics [ABS], 2022). For the whole population, mental ill-health is estimated to cost the Australian economy up to $70 billion annually, with costs of disability, self-harm, suicide and premature death due to mental ill-health estimated at another $151 billion per year (Productivity Commission, 2020).

While mental ill-health constitutes a substantial cost to the public health system (Doran & Kinchin, 2019), Australian men tend to have lower usage of health care in general compared to women, despite comparable health needs (Burgess et al., 2009; Mansfield, Addis, & Mahalik, 2003).

Understanding patterns of mental health care use among men in Australia is essential for addressing this gap, particularly in the context of ongoing mental health needs. This chapter addresses this issue in six different ways. First, using data collected across the first three waves (2013–21) of *Ten to Men*: The Australian Longitudinal Study on Male Health (TTM), it outlines Australian men's self-reported experience and trajectories of depressive symptoms, as measured by the Patient Health Questionnaire-9 (PHQ-9). Second, this chapter examines the different types of mental health services and mental health prescriptions accessed by Australian men through linked Medicare Benefits Schedule (MBS) and Pharmaceutical Benefits Scheme (PBS) data. Third, patterns of health care usage over time, and typical monetary costs paid by men for health care, are presented. Fourth, differences in several priority population groups identified in the *National Men's Health Strategy 2020–2030*[1] are highlighted. Fifth, factors associated with the non-use of mental health care among men are presented. Finally, the chapter examines patterns of mental health service usage during COVID-19-related restrictions in 2020.

Several features of TTM are leveraged for the analyses in this chapter. The study's longitudinal nature affords examination of how men's experience of depressive symptoms change over time; repeated data collections measuring men's mental health are rare in Australia, and seldom consider other relevant information on health behaviours/attitudes. Linking TTM participants' self-report survey responses with Medicare information is also an important aspect of this chapter. Analyses use the detailed records of health care services and pharmaceuticals that are at least partly funded by the federal government under the MBS or PBS. Information on the use of such services is typically difficult to collect comprehensively, objectively and accurately in retrospective surveys, particularly when using self-report data. The linked data used in this research span nearly nine years over 2012–21, providing information between waves that is otherwise not covered by TTM survey tools. Note these data exclude mental health care services not funded under the MBS or PBS, which may include those provided by private practitioners with no Medicare rebate, publicly-funded mental health services at the state/territory level, and community-based mental health options funded through primary health care networks.[2]

The COVID-19 pandemic changed health care needs and access for many Australians. In addition to health risks associated with COVID-19 infection, public health responses involving stay-at-home 'lockdown' restrictions also affected Australians' social support and access to professional services, which led to concerns over mental health during this period (Holmes et al., 2020; Hossain et al., 2020). In response to restrictions to health care access, various services – including mental health options – were made available to the general public via telehealth.[3] Investigating changes in mental health and the use of health care during and following this period is important for determining uptake of non-traditional service options, and for informing appropriate future responses to public health crises.

1 The *National Men's Health Strategy 2020–2030* can be found at: www.health.gov.au/resources/publications/national-mens-health-strategy-2020-2030

2 Further information on the types of services covered under the MBS and PBS is available here: www.servicesaustralia.gov.au/about-medicare?context=60092

3 Telehealth services for mental health had been available before the COVID-19 pandemic for residents in remote areas (i.e. where in-person health care is very difficult to provide).

Research objectives

This chapter used data from the first three waves of *Ten to Men* (TTM) across 2013–21 to:

1. investigate the prevalence and changes in self-reported depressive symptoms among Australian men between 2013 and 2021
2. identify the frequency of, and financial costs associated with, MBS service use and PBS medication usage for mental health among Australian males
3. describe changes in the prevalence of MBS- and PBS-funded mental health care usage and out-of-pocket expenses over 2013–20
4. investigate levels of MBS service use and PBS prescription access for mental health among Australian males by demographics of interest and experience of depressive symptoms
5. examine the characteristics of men reporting greater depressive symptoms who did not access relevant MBS services or PBS medications
6. describe MBS and PBS usage patterns relating to mental health among Australian men following the commencement of the COVID-19 pandemic and implementation of related restrictions nationwide.

Method

This section describes the key measures and data analysis techniques used to address the above objectives. Bandara, Howell, Silbert, and Daraganova (2021) and Swami et al. (2022) provide more information regarding the overall methodology of the TTM study.

Measures

Mental health (depression): PHQ-9

Included at each of the first three waves of TTM data collection, the PHQ-9 (Kroenke, Spitzer, & Williams, 2001) was used to measure self-reported experiences of depressive symptoms among participants in the two weeks preceding the survey. Total scores for the PHQ-9 range from 0 to 27, with higher scores indicating greater levels of depressive symptoms. Scores can be assigned to five categories of depression severity: None or minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27).

MBS and PBS data linkage

For TTM participants who provided consent (N = 8,887, 64% of the adult sample in 2013/14), their self-report survey responses were linked to Medicare data spanning from 2 March 2012 to 15 February 2021 (Bandara, Howell, & Daraganova, 2021). Medicare data indicate participants' receipt of health care services through the MBS and dispensed (filled) medical prescriptions through the PBS.

With around 90% of the Australian population accessing an MBS service in 2014–15 and the PBS subsidising approximately 75% of prescribed medicines (Australian Institute of Health and Welfare [AIHW], 2016; Mellish et al., 2015), the linked data can be used to achieve a detailed picture of participants' use of services and pharmaceuticals funded under the MBS and PBS between 2012 and 2021.

It is important to note, however, that health care services not funded under the MBS or PBS may include unfilled and private prescriptions, over-the-counter medications and prescriptions filled for public or private hospital in-patients, in addition to services for patients in public hospitals and other publicly funded mental health services at the state/territory level, services provided by private practitioners with no Medicare rebate and community-based health services funded through primary health care networks (AIHW, 2018; Mellish et al., 2015; van Gool, Parkinson, & Kenny, 2015). Therefore, any findings presented in this chapter likely do not fully capture mental health care use by the TTM sample.

The linked Medicare data contain information on treatments for many different types of health conditions. Classification of those relevant to mental health are in line with definitions of mental health services by the AIHW (2022). Mental health services are classified by their MBS item numbers across five categories: psychiatrists, general practitioners (GPs, specifically for mental health reasons), clinical psychologists, psychologists not excluding clinical psychologists,[4] and other allied health providers. Mental health prescriptions are identified by their Anatomical Therapeutic Chemical (ATC) codes and may correspond to five categories: antipsychotics (N05A), anxiolytics (N05B), hypnotics and sedatives (N05C), antidepressants (N06A), and psychostimulants (N06B).

In rare cases (n = 103 TTM participants), consent was provided but the individual had no recorded health care through the MBS/PBS; these individuals were counted in the linked data sample as not having accessed mental (or any) healthcare between 2012 and 2021. This is distinguished from even rarer instances (n = 2 TTM participants) where consent was provided but data linkage was unsuccessful. Since the Medicare data were successfully extracted for all but two of 8,889 men who provided consent, there is minimal susceptibility to statistical bias from linkage error (Doidge & Harron, 2019).

Socio-economic, demographic and other factors

This chapter uses several socio-economic, demographic and other factors measured through the TTM survey to give context to the health care needs and usage among Australian men. Their age, educational attainment, employment status, marital/partnered status, area of residence (distinguishing major cities from regional/remote areas) and financial hardships are accounted for. Financial hardships are measured through an index counting whether the individual asked for financial help from friends or family, and how many of the following could not be paid for due to a shortage of money: (a) a prescription, (b) medical care, (c) bills, (d) mortgage/rent.

The Conformity to Masculine Norms Inventory (CMNI) was included in analysis to account for attitudes and adherence to traditional masculine norms, given that greater adherence to traditional masculine norms has been associated with poorer health literacy (Milner, Shields, & King, 2019) and health behaviours (Mahalik, Levi-Minzi, & Walker, 2007). The CMNI comprises 22 items and total scores range from 0–22, with higher scores indicating greater conformity to masculine norms (Mahalik et al., 2003).

Additionally, the chapter uses information about Aboriginal and Torres Strait Islander identity, culturally and linguistically diverse backgrounds (CALD), and whether the individual has a functional difficulty or disability. Functional difficulty or disability was measured through the Washington Group Short Set (WGSS) across six core functional domains: vision, mobility, hearing, cognition, self-care and communication.[5]

Analysis

Addressing the first research objective, survey data from Waves 1–3 were used to tabulate depressive symptoms and examine transition rates between PHQ-9 categories over time. All remaining research objectives used both survey data and linked Medicare data in conjunction, to show the prevalence and costs of health care items over time and by survey characteristics. The analyses throughout this chapter are unweighted.

Linear regression models were estimated to address the fifth research objective: to identify the factors and characteristics of men associated with non-use of mental health care. Models were disaggregated by PHQ-9 category (No to minimal/mild vs moderate/moderately severe/severe) to highlight cases where men may have needed mental health care but did not receive it. These models included the set of control variables outlined above, and standard errors were clustered at the individual level as most men had repeated observations. Interpreted as a linear probability model, the estimated constant indicates the probability of non-use of mental health care for the reference category, while estimated coefficients modify this probability with all other factors left unchanged.

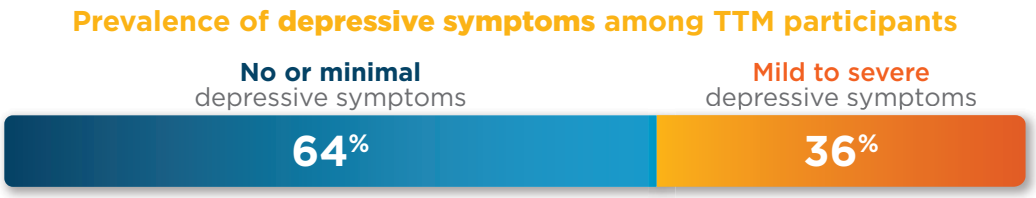
4 Some MBS items are exclusive to clinical psychologists and are classified as such. Other items are provided by psychologists in general and typically attract a lower fee, which may include clinical psychologists (but not in an exclusive manner). Clinical psychologists may therefore provide services across both categories; these records are not double-counted. Since clinical psychology items typically attract higher MBS fees, there is little financial incentive for clinical psychologists to provide general psychology MBS items.

5 More information on the WGSS can be found at www.washingtongroup-disability.com/question-sets/wg-short-set-on-functioning-wg-ss

Findings

Prevalence and changes in experience of depressive symptoms between 2013 and 2021

Table 2.1 shows the proportions of TTM participants in each PHQ-9 category across the first three waves of data collection in 2013/14, 2015/16 and 2020/21 (Waves 1–3, respectively). Wave 3 data collection was undertaken during the COVID-19 pandemic. These data suggest that, while most (64%) Australian men in the sample had no or minimal depressive symptoms, around 36% experienced mild to severe depressive symptoms.



These proportions remained quite similar over time, which suggests that the distribution of PHQ scores collected at the time of the COVID-19 pandemic was similar to previous years. Analysis of health service usage before and during COVID-19 is presented later in the chapter.

Table 2.1: Percentages of TTM participants by depression (PHQ-9) category in 2013/14, 2015/16 and 2020/21

PHQ-9 category	2013/14 (Wave 1) % [95% CI]	2015/16 (Wave 2) % [95% CI]	2020/21 (Wave 3) % [95% CI]	Overall % [95% CI]
No or minimal	62.9 [61.9, 64.0]	65.1 [64.0, 66.2]	65.5 [64.2, 66.8]	64.3 [63.6, 65.0]
Mild	23.7 [22.7, 24.6]	23.0 [22.0, 24.6]	22.3 [21.2, 23.5]	23.1 [22.5, 23.7]
Moderate	8.3 [7.7, 8.9]	7.3 [6.7, 7.9]	7.4 [6.7, 8.1]	7.7 [7.4, 8.1]
Moderately severe	3.1 [2.8, 3.5]	3.1 [2.7, 3.5]	3.2 [2.7, 3.5]	3.1 [2.9, 3.4]
Severe	1.9 [1.6, 2.2]	1.6 [1.3, 1.9]	1.6 [1.3, 2.0]	1.7 [1.5, 1.9]
Observations	8,680	6,974	5,011	20,665

Notes: Data presented here relate only to participants with linked Medicare data from Wave 1. 95% CI = 95% confidence interval; PHQ-9 = Patient Health Questionnaire

Source: TTM data, Waves 1, 2 and 3, adult cohort, unweighted

To help understand how the prevalence of depressive symptoms among men changed over time, Table 2.2 displays the proportions of TTM participants in each category across 2013/14 and 2015/16. Specifically, it shows the proportions of men who moved from one depression category to another over this two-year period. Likewise, Table 2.3 shows the equivalent transition rates between categories over the approximate five-year period between 2015/16 and 2020/21. To assist with interpretation of the transition matrices in Table 2.2 and Table 2.3, cells are colour-coded. Green, yellow and red correspond to improvements, no change and deteriorations in experiences of depression symptoms, respectively, as classified using PHQ categories (see notes below each table).

For most men, reports of low burden of depressive symptoms remained stable over time. Indeed, 83% of men in 2013/14 who were categorised as having no or minimal depression severity remained in this category in 2015/16. Similarly, 81% of men in 2015/16 with no or minimal depression severity remained in this category in 2020/21.

By comparison, fewer than half of men in the mild to severe depressive symptoms categories remained in the same category when surveyed at the following wave (indicated by the yellow diagonal cells in Tables 2.2 and 2.3).

The proportions of men experiencing mild to severe depressive symptoms, who then reported lower levels of symptoms when later surveyed (i.e. an improvement in mental health across waves; indicated by the green cells) are also shown in Table 2.2 and Table 2.3. Between 10% and 42% of men reported improvement in symptoms between Waves 1 and 2 and Waves 2 and 3.

In contrast, a decline in depressive symptoms across waves (indicated by the red cells in both tables) saw percentages that ranged between 0.3% and 14%.

The proportion of men who reported severe depressive symptoms at one wave and subsequently reported severe depressive symptoms in the following survey wave ranged between 32% and 34%.

To compare depressive symptoms over a longer period of time, Table S2.1 in the Supplementary Materials shows changes between 2013/14 and 2020/21. Transition rates to other PHQ-9 categories tend to be slightly higher, in line with the longer time frame, where men may have experienced improvements or deteriorations in depressive symptoms. The overall pattern of transition rates remains similar to Table 2.2 and Table 2.3, however, again indicating that men in the sample were more likely to report reduced depressive symptoms over time (or remain in the lowest symptoms category).

Data across the three survey waves in 2013/14, 2015/16 and 2020/21 indicate that enduring depressive symptoms are rare. Among men who responded at all three waves, under 2% reported moderately severe or severe depressive symptoms every time they were surveyed. This corresponds to a population estimate of around 52,000 Australian men reporting moderately severe or severe symptoms in 2013/14, 2015/16 and 2020/21. In contrast, nearly 50% of men in the sample had reported no to minimal depressive symptoms at every survey, showing that a lower burden of depression tends to persist over time while greater depressive symptoms are less likely to endure over a longer period.

Table 2.2: Transition matrix of depression (PHQ-9) categories between 2013/14 (Wave 1) and 2015/16 (Wave 2)

	2015/16 (Wave 2)				
2013/14 (W1)	No or minimal	Mild	Moderate	Moderately severe	Severe
No or minimal	82.9	13.7	2.3	0.9	0.3
Mild	41.9	43.8	10.8	2.6	0.8
Moderate	22.8	35.1	26.0	10.4	5.7
Moderately severe	6.5	26.6	33.2	24.6	9.0
Severe	10.4	20.0	15.7	21.7	32.2

Notes: Data presented here relate only to participants with linked Medicare data at Waves 1 and 2. A transition matrix containing percentages of men (*N* = 6,844) in each PHQ-9 category in 2013/14 (rows, *N* = 4,396, 1,604, 530, 199, 115 respectively across no to minimal, mild, moderate, moderately severe and severe categories) that transitioned to PHQ-9 categories in 2015/16 (columns). Green cells indicate reduced depressive symptoms over time; yellow cells indicate remaining in the same category over time; red cells indicate heightened depressive symptoms over time.

Source: TTM data, Waves 1 and 2, adult cohort, unweighted

Table 2.3: Transition matrix of depression (PHQ-9) categories between 2015/16 (Wave 2) and 2020/21 (Wave 3)

	2020/21 (Wave 3)				
2015/16 (W2)	No or minimal	Mild	Moderate	Moderately severe	Severe
No or minimal	81.2	15.2	2.5	0.8	0.3
Mild	44.3	36.8	14.2	4.0	0.7
Moderate	16.3	40.4	25.0	12.5	5.8
Moderately severe	13.3	26.6	25.8	21.1	13.3
Severe	10.4	20.9	10.4	23.9	34.3

Notes: Data presented here relate only to participants with linked Medicare data at Waves 2 and 3. A transition matrix containing percentages of men (*N* = 4,699) in each PHQ-9 category in 2015/16 (rows, *N* = 3,138, 1,054, 312,128, 67 respectively across no to minimal, mild, moderate, moderately severe, and severe categories) who transitioned to PHQ-9 categories in 2020/21 (columns). Green cells indicate reduced depressive symptoms; yellow cells indicate remaining in the same category; red cells indicate heightened depressive symptoms.

Source: TTM data, Waves 2 and 3, adult cohort, unweighted

Mental health service use and prescribed mental health medications among Australian males

Overall prevalence and costs of mental health care usage

Table 2.4 summarises MBS and PBS usage by TTM participants over 2012–21. It shows the aggregate number of records, prevalence of users among the TTM sample (i.e. ever accessed between 2012 and 2021) and details of costs by each mental health service and mental health medication category. Since health care services are subsidised at different levels, cost information includes both the proportion of service/prescription records that are fully subsidised, and therefore incur zero out-of-pocket costs, and the median non-zero costs for each category. Patterns over time for usage and cost data are presented in the following subsection. Findings from Table 2.4 indicate that 31% of men in the sample accessed mental health services and 33% accessed mental health prescriptions at some point at least once over the nearly nine-year period.

Table 2.4: Prevalence and out-of-pocket costs of mental health services and prescriptions for adult males, 2012–21 (*N* = 8,887)

	Records (*n*)	Unique Users (*n*)	Prevalence (%)	Propn. Zero Cost (%)	Item median non-zero Cost ($)
Mental health services (MBS)					
Psychiatrists	7,974	517	5.8	29.7	51.95
General practitioners (mental health-specific)	11,009	2,573	29.0	83.8	33.95
Clinical psychologists	5,971	762	8.6	39.8	55.50
Psychologists including clinical psychologists	7,909	1,111	12.5	49.9	60.20
Other allied health providers	1,063	165	1.9	67.7	45.20
Total: Any mental health service	33,926	2,707	30.5	54.9	54.75
Mental health prescriptions (PBS)					
N05A Antipsychotics	12,161	335	3.8	8.9	6.30
N05B Anxiolytics	7,727	1,011	11.4	18.7	6.40
N05C Hypnotics and sedatives	2,786	789	8.9	10.2	7.56
N06A Antidepressants	71,529	2,219	25.0	5.3	13.36
N06B Psychostimulants	2,346	105	1.2	4.3	17.10
Total: Any mental health prescription	96,549	2,954	33.2	6.9	12.56

Notes: MBS = Medicare Benefits Schedule; PBS = Pharmaceutical Benefits Scheme. For each category of mental health service and prescription, displayed are the number of records in the linked Medicare data between March 2012 and February 2021, the number of unique TTM individuals who accessed these health care items, the proportion of the sample with linked Medicare data who accessed these health care items, the proportion of records that involved zero out-of-pocket costs to the user, and the median value of non-zero out-of-pocket costs. Classifications of mental health services and prescriptions follow AIHW (2022). Some MBS items are exclusive to clinical psychologists; however, clinical psychologists may also provide services listed on the MBS that correspond to psychologists more generally. Clinical psychologists may therefore provide services across both categories; these records are not double counted.

Source: TTM, Wave 1, adult cohort, linked Medicare data from MBS (top) and PBS (bottom); Classifications of mental health services and prescriptions from AIHW (2022)

Mental health service usage and cost from MBS data between 2012 and 2021

Service use

As detailed in Table 2.4, around three in 10 men in the TTM sample (31%) accessed any MBS mental health service at some point between March 2012 and February 2021. Visits to a GP specifically for mental health reasons was the most prevalent mental health service type; 29% of men in the sample – nearly all the men who had accessed any mental health service – had consulted a GP at least once during this nine-year period.

Among specialist services, visits to psychologists and clinical psychologists were also somewhat common (taken up by 13% and 9% of the sample, respectively). By contrast, visits to psychiatrists (6%) and other allied health providers (2%, usually a social worker) were relatively uncommon. Despite the lower prevalence of these specialist services in terms of unique (individual) users, the men who accessed such help tended to do so repeatedly.

For example, psychologist and psychiatrist services constituted 23% and 24% of all mental health service records over the nine-year period, despite being used by comparatively fewer individuals. The high number of records is likely reflective of the nature of mental health service treatment, which can often involve repeated contact and support by the health professional (Bruijniks et al., 2015).

Out-of-pocket expenses

Table 2.4 also shows the proportion of health services provided without out-of-pocket expense to the individual. Notably, a very high rate (84%) of GP mental health visits incurred no fees. Other mental health services were also provided without incurring out-of-pocket expenses at high rates – overall, more than half of all mental health services were supplied at no out-of-pocket cost to the individual. In addition to the use of bulk-billed services,[6] many health visits could also have been covered by the Better Access initiative,[7] which subsidised up to 10 mental health services per calendar year from most of 2012–19, and was expanded to up to 20 services in 2020 in response to COVID-19.

The median costs in Table 2.4 are a measure of typical expenses in cases when services required any out-of-pocket expenditure. The highest median costs in these cases were visits to psychologists and psychiatrists, which often involved payments over $50. Since men may access these health services repeatedly, typical annual costs are described in the next section.

PBS data: Mental health prescription usage and cost between 2012 and 2021

Linked Medicare data detailing mental health medications offered through the PBS and prescribed to TTM participants are also presented in Table 2.4.. Findings show that nearly one in three men (33%) filled a mental health prescription at some point over the nine-year period. Among these medications, antidepressants were the most commonly prescribed. Antidepressants constituted 74% of all mental health prescription records, and one-quarter (25%) of the TTM sample filled at least one such prescription between 2012 and 2021.

One disproportionately large category of mental health medication were antipsychotics; despite only being used by 4% of the sample, antipsychotic prescriptions constituted 13% of mental health PBS records.

The data provided in Table 2.4 further indicate that mental health prescriptions are often not provided with zero out-of-pocket expense; these medicines are below the $42.50 general patient co-payment (current in

6 'Bulk billing' is when the Medicare benefit defined in the MBS is accepted by the health service provider as the full payment, such that no additional cost needs to be paid by the patient/client for a given service. Further information can be found at www.servicesaustralia.gov.au/bulk-billing?context=60092

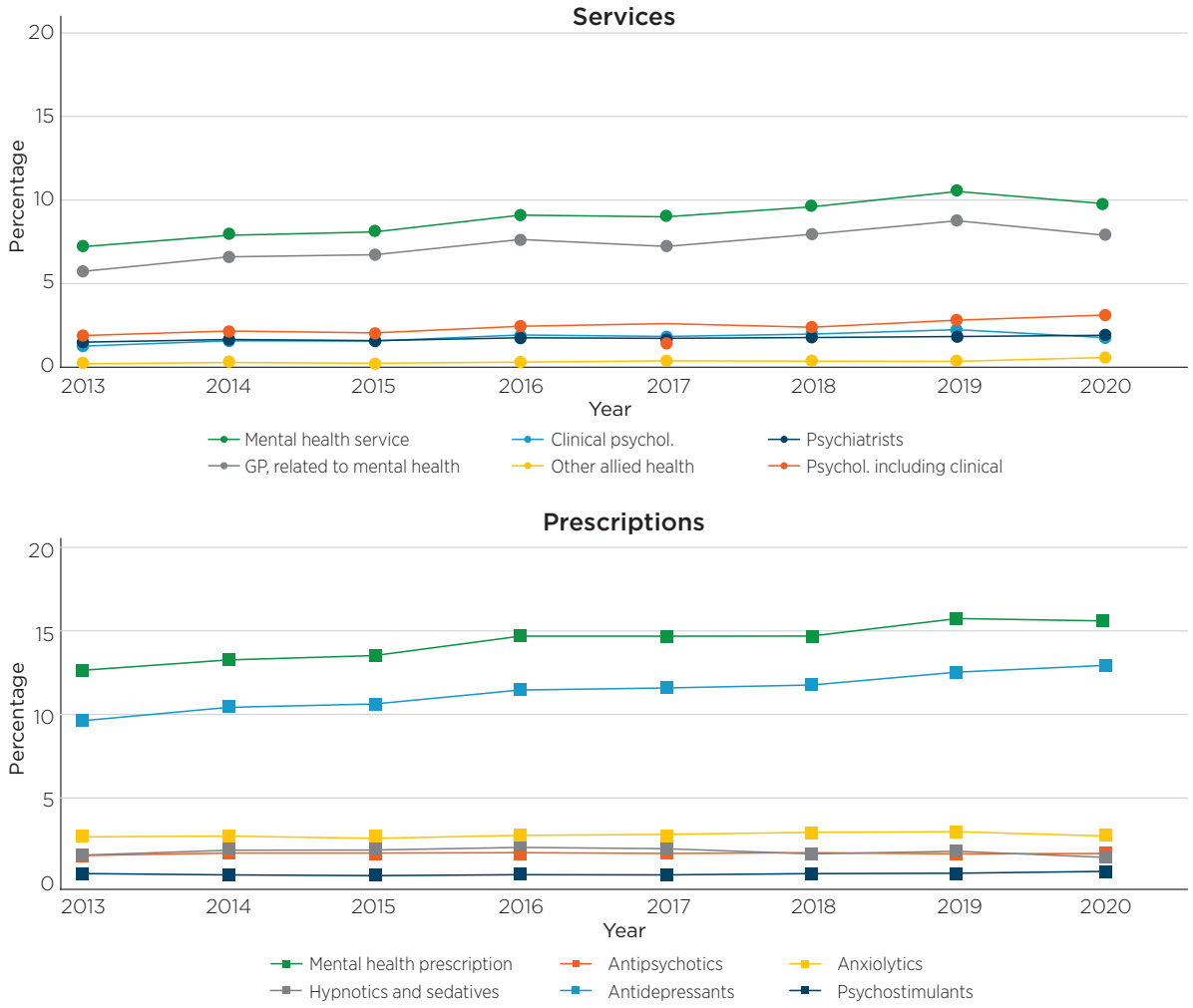
7 The Better Access Initiative provided for up to 10 individual mental health services in a calendar year. More information can be found at www.health.gov.au/initiatives-and-programs/better-access-initiative

2022), and the cost of PBS prescriptions for all patients is capped by the maximum co-payment amount.[8] Instances where pharmaceuticals are provided with zero or reduced expense to the patient may be due to the PBS Safety Net, where medications are provided at reduced cost (free for holders of concession cards) once a household has already spent a threshold amount on PBS medications in a calendar year (in 2022 the PBS Safety Net thresholds were $326.40 for concession card holders and $1,542.10 for general patients). Psychostimulant prescriptions had the highest median cost of $17.10, followed by antidepressant prescriptions with a median cost of $13.36 (both of these pharmaceuticals are below the general co-payment threshold of $42.50; hence the cost is fully borne by the patient).

Changing prevalence and cost in mental health care between 2013–20

To aid in understanding whether usage of mental health care has changed over time, Figure 2.1 displays the proportions of the TTM sample who had accessed any mental health service or been prescribed any mental health medication within each calendar year 2013–20.[9] It also presents trends for the five service types and five medications listed in Table 2.4. Individual and contextual factors associated with the use of any mental health service or prescription are explored in the next section of this chapter.

Figure 2.1: Usage rates by mental health care service and prescription, 2013–20



Notes: Displayed are percentages of the TTM sample that accessed a mental health service (top) or mental health prescription (bottom) in each calendar year (*N* = 8,887 for 2013–17; *N* = 8,784 for 2018–20 due to withdrawn linkage consent during 2017. These cases of withdrawn consent led to a conservative estimate only in 2017.)

8 Comprehensive information on PBS fees, patient contributions and Safety Net thresholds is available at: www.pbs.gov.au/info/healthpro/explanatory-notes/front/fee

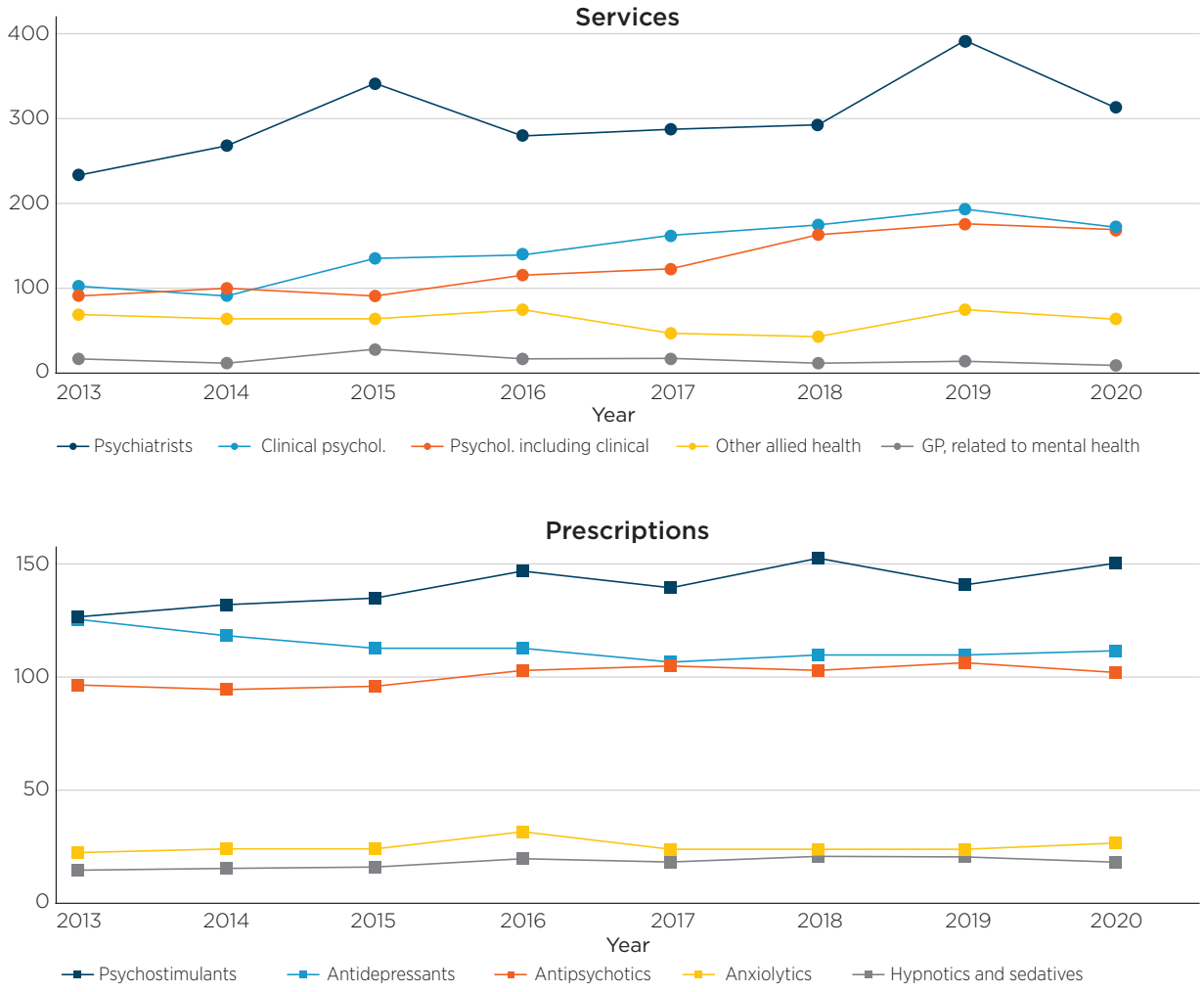
9 Since linked Medicare data do not fully cover 2012 and 2021, these were omitted from Figure 2.1. A small number of individuals also withdrew consent for data linkage during 2017, which resulted in a conservative estimate for that year.

Source: TTM, Wave 1, adult cohort, linked Medicare data from MBS (top) and PBS (bottom)

Figure 2.1 shows that the use of any mental health service by TTM participants increased over the observed period, from 7% of the sample in 2013 to 10% in 2020. Although there were some minor increases in visits to psychologists and psychiatrists, much of the overall increase was driven by visits to GPs for mental health reasons, which increased from 6% to 8% over the same period. Similarly, rates of accessing any mental health prescription increased from 13% to 16% of the sample between 2013 and 2020. This was largely driven by an increase in prevalence of antidepressant prescriptions from 10% to 13%, with other medications remaining stable and less commonly prescribed over the period.

As indicated in Table 2.4, mental health services and medications can involve different rates of repeated usage and out-of-pocket expenses. In Figure 2.2, the average annual out-of-pocket expenses are shown for users of each type of mental health treatment across the eight years.

Figure 2.2: Average annual out-of-pocket costs by mental health care service and prescription, 2013–20



Notes: Displayed are average annual out-of-pocket costs among TTM participants who had used the corresponding mental health service (left) or mental health prescription (right).

Source: TTM, Wave 1, adult cohort, linked Medicare data from MBS (left) and PBS (right)

Among mental health services, visits to GPs for mental health reasons involved very low average annual expenditures, with little marked change over time. Total yearly out-of-pocket expenses among men who consulted their GP regarding mental health remained below $30 during 2013–20. This may again reflect the availability of bulk-billed services or subsidies through the Better Access initiative.

Out-of-pocket expenses for other allied health providers fluctuated over the same period, ranging from between $40 to $80 annually. However, average total annual expenditures rose substantially for men accessing services from psychologists and psychiatrists, increasing 73% from just over $90 in 2013 to $170

in 2020 for general psychologists, 88% from $100 in 2013 to $172 in 2020 for clinical psychologists, and 36% from $230 to over $300 for psychiatrists over the same period. Typical annual costs for men who visited psychiatrists were the highest, remaining over $200 between 2013 and 2020.

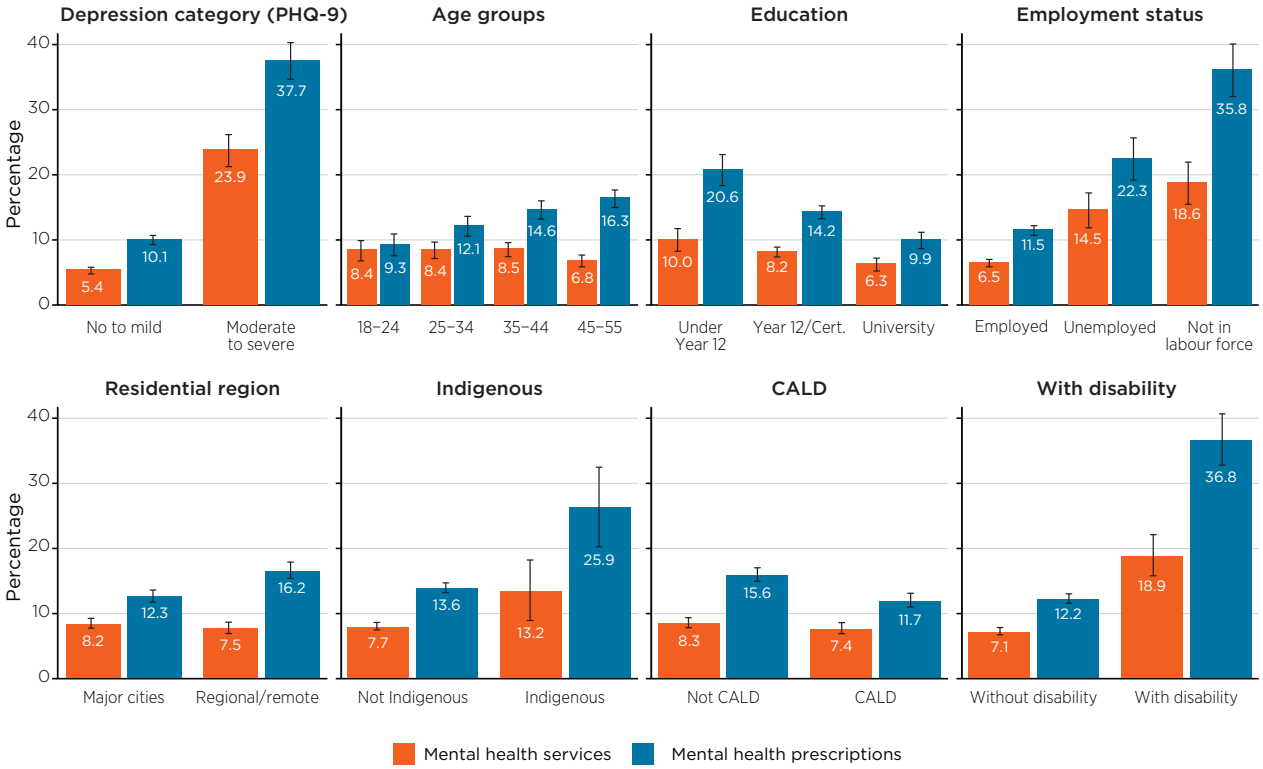
Average annual expenses for mental health medications remained steady in most cases. Patient contributions for antipsychotics, anxiolytics and hypnotics and sedatives changed little over time, with average annual expenses for antidepressants (as a major category of mental health prescription medication) decreasing by 12% from $125 in 2013 to $111 in 2020. In comparison, average annual costs for men prescribed psychostimulants increased by 20% from $126 in 2013 to $150 in 2020 (these were the most expensive medicines considered and are above the concessional co-payment threshold).

Factors associated with mental health care

Differences in mental health services and prescriptions

Bivariate associations were examined between mental health care usage and individual and contextual characteristics among adult participants (18–55 years) at Wave 1 of TTM (2013/14). Figure 2.3 shows the annual proportion within each group who accessed mental health services or prescriptions in 2014.

Figure 2.3: Annual mental health care usage rates by depression category (PHQ-9) and socio-demographic characteristics, 2014



Notes: Figure displays the proportion of TTM adults with linked Medicare information that accessed mental health services or mental health prescriptions in 2014 along with 95% confidence intervals, by categories of PHQ-9, age, education, employment, residential region, Aboriginal and Torres Strait Islander identity, cultural and linguistically diverse (CALD) status, and having a functional difficulty/disability. *N* = 8,887

Source: TTM, Wave 1, adult cohort, linked Medicare data from MBS and PBS

Figure 2.3 shows that men who reported moderate to severe depressive symptoms were significantly more likely to access mental health services and prescriptions than men reporting no to mild symptoms. Over one in three men (38%) in the consolidated moderate, moderately severe and severe PHQ-9 categories had accessed mental health prescriptions, and over one in five (24%) had used a mental health service. Importantly, however, around three in four men with moderate or greater depressive symptoms did not access a mental health service in 2014, despite the indication that they may have needed it.

Likely reflecting reduced need, a much lower proportion of men with no to mild depressive symptoms accessed mental health services and prescriptions (5% and 10% respectively), showing that mental health needs track strongly with usage of mental health care.

Usage of mental health services tended to be similar across the age profile; on average, 7%–9% of males accessed an MBS-funded mental health service each year, regardless of age. However, usage of medications differed by age, with older men receiving mental health prescriptions at much higher rates than younger men. For example, 16% of 45–57 year olds accessed mental health medications compared to 9% of 18–24 year olds.

Differences in accessing mental health care were evident by socio-economic background – both in aspects that tend to remain constant and those that may be circumstantial or more dynamic. For example, mental health prescriptions were higher among men who had left high school before completing Year 12 compared to those with a university degree (21% vs 10%, respectively).

A very large gap was also observed in relation to labour market outcomes; employed men were less likely to access mental health prescriptions compared to those who were unemployed (12% vs 22%, respectively). Both of these groups were also less likely to access mental health services and prescriptions than men out of the labour force (36%). This trend was reflected in MBS records; an average of around 7% of employed men accessed mental health services on an annual basis, compared to 15% of unemployed men and 19% of men not in the labour force. This suggests that income may not be the primary barrier to accessing mental health care. As non-employed men use these services/prescriptions at higher rates, usage of health care items that are not subsidised may also use a larger proportion of their financial resources.

Rates of mental health service usage were similar for men living in major cities and regional areas (8%). However, more men in regional areas had been prescribed mental health medications (16% vs 12%, respectively) to a statistically significant extent.[10] Although regional Australians tend to have poorer access to health professionals and services (Productivity Commission, 2020), this is not evident among this sample of men in 2014.

Differences by cultural background were substantial. Men who identified as Aboriginal and/or Torres Strait Islander were more likely to access mental health care services and prescriptions (at 13% and 26% respectively) than non-Indigenous men (8% and 14%). Similar rates of service usage were observed among culturally and linguistically diverse (CALD) and non-CALD men (7% vs 8%, respectively); however, CALD men tended to access mental health prescriptions at lower rates than their non-CALD counterparts (12% vs 16%).

Men who were classified as experiencing some functional difficulty and/or disability across any WGSS domain had much higher rates of accessing mental health services (19%) and prescriptions (37%) compared to men without difficulty/disability (7% and 12%, respectively).

Factors associated with non-use of mental health care

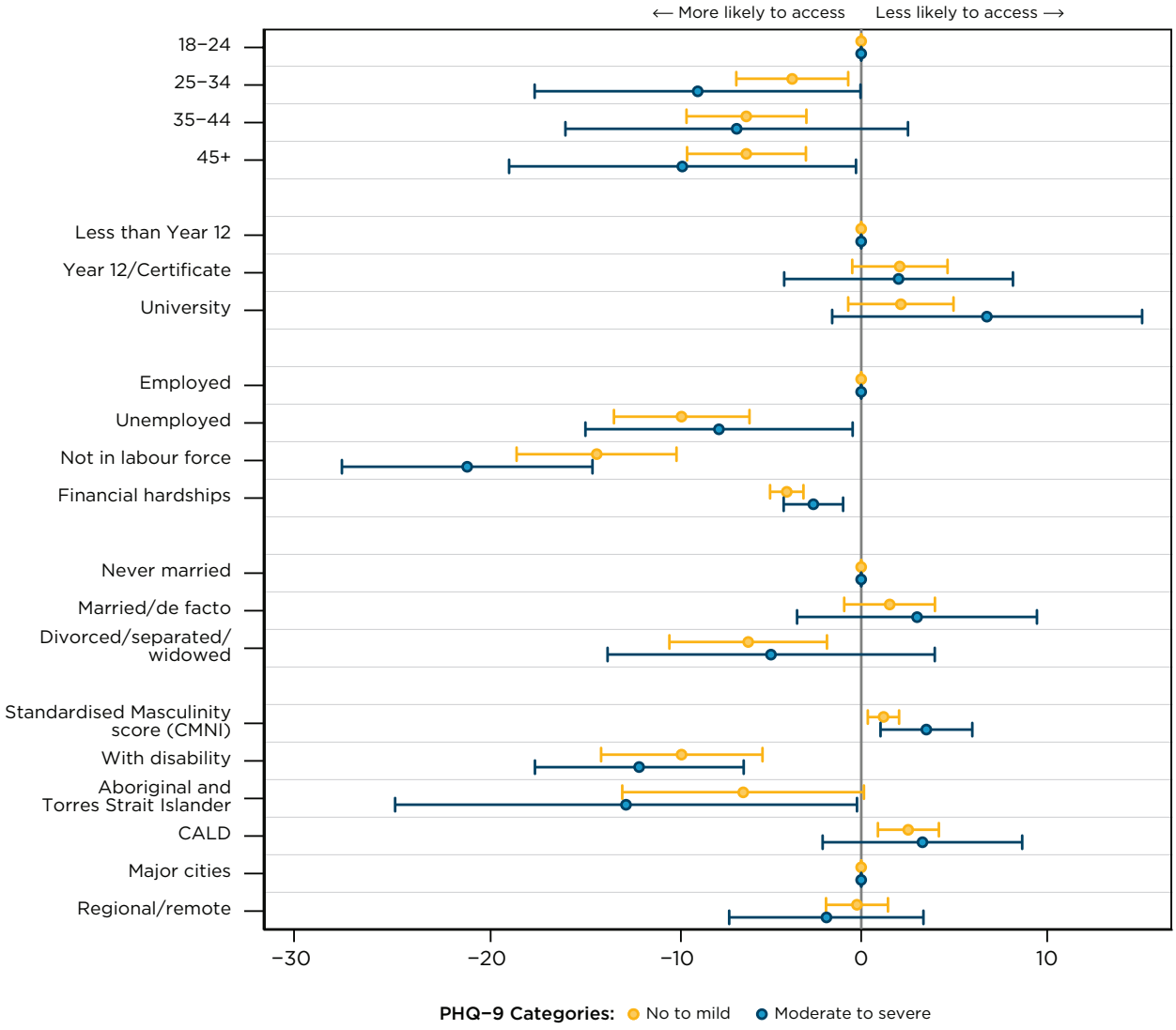
The model depicted in Figure 2.4 compares men's non-use of mental health care against those who used such services or prescriptions within two years of their interviews in 2013/14 and 2015/16 (Waves 1 and 2 of TTM).[11] By orienting the model around non-use, the results highlight groups or factors associated with lower access to mental health services and prescriptions. The models are disaggregated by PHQ-9 categories (no to minimal and mild vs moderate, moderately severe, and severe) so that the results are adjusted for lower/higher depressive symptoms. Crucially, this helps identify socio-economic and other factors (see Table S2.2) associated with lower access of mental health care among men with greater mental health needs. For brevity, the following analysis refers to moderate, moderately severe, and severe depressive symptoms as 'greater depressive symptoms' in contrast to the no to minimal and mild PHQ-9 categories.

10 Males living in remote and very remote areas of Australia were not recruited in Wave 1 of TTM; therefore, no comparisons can be made with residents of these areas. At Waves 2 and 3, the number of men who resided in remote areas was very low (n = 23 in Wave 2, n = 9 in Wave 3); to facilitate statistical analysis residents of regional/remote areas were grouped together.

11 This corresponds to mental health care records between 2013 and 2016 for Wave 1 and 2015 and 2018 for Wave 2 of TTM. Since linked Medicare data were only available up until February 2021, at the time of writing it was not possible to analyse (non-)use of health care for two years following Wave 3 of TTM.

Figure 2.4 summarises the estimates from the model (full results are provided in the supplementary material in Table S2.3). For the reference case (18–24 years old, not completed Year 12, employed, without financial hardship, never married, resided in a major city, without functional difficulty/disability, and neither Indigenous nor CALD), the probability of not accessing mental health care within two years of being surveyed among men with no to mild depressive symptoms was 88%, compared to 66% among men reporting greater depressive symptoms. The estimated coefficients can be interpreted as modifiers to these probabilities, holding other factors constant. In Figure 2.4, factors to the left (negative) indicate a greater likelihood of having accessed mental health care during the two years following Wave 1 and 2 interviews, whereas factors to the right (positive) indicate a reduced likelihood of engaging with mental health care.

Figure 2.4: Factors associated with non-usage of mental health care two years following interviews in 2013/14 and 2015/16, by depression (PHQ-9) category (*N* = 8,887)



Notes: Plot of coefficient estimates (as percentages) and 95% confidence intervals from linear probability models on not accessing mental health care two years following interviews in 2013/14 and 2015/16, disaggregated by PHQ-9 category: No to minimal/Mild (*N* = 7,518 individuals, 12,683 obs.) and Moderate/Moderately severe/Severe (*N* = 1,411 individuals, 1,803 obs.). CALD = Culturally and linguistically diverse; CMNI = Conformity to Masculinity Norms Index. The CMNI measures extent of conformity to traditional masculine roles; total scores range from 0–66, with higher scores indicating greater conformity to masculine norms. Standard errors are clustered at the individual level. Significant negative values (i.e. to the left of the vertical line) indicate association with accessing mental health care within two years of interview; significant positive values (i.e. to the right of the vertical line) indicate associations with not accessing mental health care within two years of interview. 'Financial hardships' = index counting whether asked friend/family for financial help, and if couldn't pay for: (a) prescriptions, (b) medical care, (c) bills, (d) mortgage/rent.

In line with the descriptive, cross-sectional evidence in Figure 2.3 from 2014, rates of mental health care access differed by age, particularly among men reporting greater depressive symptoms. Among these men, those who were younger and aged 18–24 years were around 9 percentage points less likely than men

aged 25–34 and 45 and over to access any mental health care two years after interview. Differences by education level were not statistically significant but positive point estimates suggest that more educated men with greater depressive symptoms could have a lower tendency to access mental health care.

Compared to employed men, the model results showed that unemployed men – and to a greater extent, men out of the labour force – were more likely to have accessed mental health care. These associations were large for men reporting greater depressive symptoms; unemployed men were 8 percentage points more likely to access mental health care within two years of the survey, and men who were out of the labour force were 21 percentage points more likely to access mental health care during this time. Financial hardships were associated with a 3–4 percentage point increase to the likelihood of accessing mental health care for men irrespective of mental health status.

Compared to men who had never married, those who were married or living in de facto partnerships were neither significantly more nor less likely to access mental health care. However, men who had divorced, separated or become widowers were more likely to have accessed mental health care within two years after being surveyed, although this was only statistically significant for men who reported no to mild depressive symptoms.

Men who lived in regional areas were neither statistically more nor less likely to access mental health care when compared to those who resided in major cities. The bivariate differences by area of residence displayed in Figure 2.3 may therefore reflect other demographic, socio-economic or individual differences between men from major cities and regional areas that are captured by the model rather than an inherent regional effect.

One factor found to be associated with non-usage of mental health care was conformity to masculinity norms, captured through the Conformity to Masculinity Norms Index (CMNI) score (higher scores indicate greater conformity to masculine norms). An increase in CMNI score by one standard deviation among men reporting greater depressive symptoms was associated with a 3.4 percentage point increase in the probability of not accessing mental health care within the following two years. A smaller but also statistically significant association of 1.2 percentage points was also estimated for men reporting no to mild depressive symptoms.

Men with self-reported disability were more likely to access mental health care within two years of each survey wave. This association was larger among men reporting greater depressive symptoms (12 percentage points) than men reporting no to mild symptoms (10 percentage points).

Estimates for Aboriginal and/or Torres Strait Islander identity suggests that Indigenous men were more likely to access mental health care than men who did not identify as Aboriginal and/or Torres Strait Islander. The point estimates were larger among men reporting greater depressive symptoms than men with no to mild symptoms (12 vs 6 percentage points, respectively).

Men from CALD backgrounds in the sample with no to mild depression were three percentage points less likely to access mental health care than non-CALD men. A similar coefficient was estimated for CALD men reporting greater depressive symptoms; however, this was not statistically significant.

Mental health care following the COVID-19 pandemic

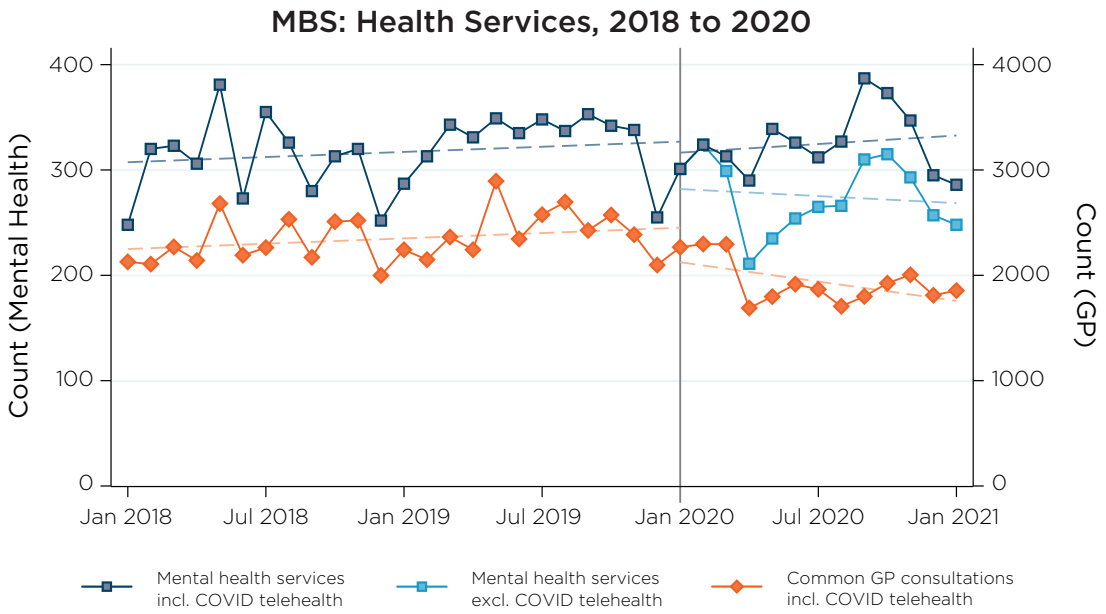
As described at the start of this chapter, the TTM sample reported similar rates of depressive symptoms around mid-to-late 2020 (during Wave 3 of the data collection) when compared to earlier survey waves. This yields suggestive (but inconclusive) evidence that mental health needs in the first year following the COVID-19 pandemic were similar to mental health needs in 2013/14 and 2015/16.

However, the linked Medicare data for the TTM survey do show nuanced changes in health care following the COVID-19 pandemic. Figure 2.5 displays the monthly counts of mental health services (labelled along the left vertical axis) benchmarked against 'typical' GP consultations[12] (i.e. consultations not designated as mental-health-specific; labelled along the right vertical axis) between January 2018 and January 2021. Fitted dashed lines delineate the trends in health care usage before the pandemic between January 2018 and January 2020, and during the first year of the pandemic between January 2020 and January 2021.

12 Typical GP consultations are defined as MBS items 3, 23, 36 and 44, which are in-person consultations of varying time lengths, as well as items 91790, 91800, 91801 and 91802, which are corresponding telehealth counterparts. Typical GP consultations are much more common than mental health services; a separate scale is used in Figure 2.5 to facilitate comparisons.

To aid interpretation, typical GP consultations are presented in Figure 2.5 as a comparison category. Typical GP consultations constitute the most common category of health care service in the linked MBS data, thus serving as a broad indicator of men's health care access and usage. Even when including COVID telehealth options, the number of typical GP consultations declined in April 2020 (soon after border closures and widespread lockdown restrictions were introduced in both Victoria and New South Wales in March) and remained at lower levels until the end of the observation period in early 2021.

Figure 2.5: Counts of mental health service utilisation and common GP consultations, January 2018–January 2021



Notes: Displayed are counts of health care services in each calendar month between January 2018 and January 2021. The left vertical axis displays scale/labels for mental health services as listed under Table 2.4; the right vertical axis displays scale/labels for typical GP consultations (not specifically for mental health). Dotted lines are fitted through data points before/after January 2020, displaying trends before/during the COVID-19 pandemic respectively. *N* = 8,784 individuals.

Source: TTM, adult cohort, linked Medicare data from MBS

Rates of mental health service access, when including those delivered via telehealth, remained at levels similar to those recorded prior to the COVID-19 pandemic and its associated restrictions to in-person health care, as indicated by the fitted lines around January 2020. This suggests a substantial uptake of telehealth services among the TTM sample; however, delivering MBS mental health services via telehealth did not appear to result in lower service utilisation rates.

The linked MBS data also indicate that men who accessed mental health services during the COVID-19 pandemic had different histories of mental health care utilisation. Following March 30 2020, when stay-at-home restrictions were widely imposed with limited reasons to leave home, 9% of the sample (*n* = 748) used a MBS-funded mental health service at least once. Most of these men (78%) had previously accessed mental health care between March 2012 and March 2020. However, just over one in five (22%) men who used mental health services after the pandemic and associated restrictions commenced (i.e. after March 30, 2020) had not accessed MBS-funded mental health services since 2012; that is, they accessed such mental health care for the first time in at least nine years.

Summary

This chapter examined MBS and PBS health care usage among men in the context of their reported depressive symptoms and in consideration of need, and their socio-economic status and demographic characteristics. It analysed Medicare data between March 2012 and February 2021, linked to self-report responses from the TTM survey.

Accessing mental health care

Men's reported depressive symptoms appeared to remain stable in aggregate when measured in 2013/14, 2015/16, and 2020/21. From the PHQ-9 scale of depressive symptoms, most (64%) men reported no to minimal depressive symptoms. Over 80% of men in this category would continue to report no to minimal symptoms when later surveyed, indicating a stability of relatively good mental health. For men who reported greater depressive symptoms, transitions to improved symptoms tended to be more likely (ranging from 10%–42%) than deteriorated symptoms (between 0.3%–13.7%). Between 32%–34% of men who reported severe depressive symptoms did so again in the following survey, suggesting that severe depression has a higher tendency to persist over time in comparison to milder depression.

Analyses showed that rates of both mental health service use and prescribing of mental health medications increased over the study period. Specifically, usage of mental health services increased from 7.2% of the sample in 2013 to 9.8% in 2020; mental health prescriptions likewise increased from 12.6% to 15.6% of the sample. Combined with evidence that indicated depressive symptoms remained similar across this period, the increased prevalence of mental health services and prescriptions suggests that access and norms around treating mental health may have improved between 2013 and 2021.

Predominant among men's access of mental health services were visits to GPs for mental health reasons. Between 2012 to 2021, 29% of men in the sample – nearly all the men who had accessed any mental health service—had consulted a GP about mental health at some point. This high rate relative to other service types is likely due to the role of general practice in the Australian health care system, as GPs are often the first port of call among Australian males with respect to health care needs (Swami, Terhaag, Quinn, & Daraganova, 2020) and can provide subsequent referrals to specialist services alongside the preparation of a mental health treatment plan for the individual.[13] Annual out-of-pocket costs for men who consult with GPs for mental health consistently averaged below $30 across 2013–2020. This may reflect high rates of bulk-billing, subsidised services through the Better Access program, or the primary care role of GPs as men with lower mental health needs may not require repeated GP consultations nor specialist referrals.

Antidepressants appear to play a substantial role in the treatment of men's mental health. They were the largest category of mental health medication prescribed to participants between 2012 and 2021, constituting 74% of all prescription records. One-quarter of men in the sample filled an antidepressant prescription at some point over the nine-year period. Average annual out-of-pocket costs for antidepressants decreased by 11.5% from $125 in 2013 to $111 in 2020.

In comparison, health care services from specialists such as psychologists and psychiatrists became more expensive for the 4%–6% of participants who accessed these services in a given year between 2013 and 2020.

Mental health care usage by characteristics

Evidence from the multivariate model in this chapter indicated that rates of mental health care usage differed by socio-economic, health and demographic characteristics. In line with past research (Martin et al., 2021), men who reported greater depressive symptoms were more likely to access mental health care. Despite this, a large proportion of the sample with greater depressive symptoms did not subsequently access a relevant mental health service or prescription, suggesting that unmet need exists among Australian men experiencing mental health issues.

13 Mental health treatment plans are often arranged by GPs and a part of the Better Access initiative; more details are found at www.health.gov.au/initiatives-and-programs/better-access-initiative.

The results from the model also highlighted age, employment, disability and cultural background as factors associated with not using mental health care. Irrespective of reported depressive symptoms, employed men were less likely than unemployed men – who were again less likely than men out of the labour force – to access mental health care during the two years following interview at Waves 1 and 2. This is indicative of structural barriers to accessing mental health care, possibly as employed men have fewer opportunities to access mental health services. The links between mental health and labour market outcomes are complex (Olesen, Butterworth, Leach, Kelaher, & Pirkis, 2013); past research has shown that poor mental health can adversely affect labour market outcomes (Frijters, Johnston, & Shields, 2014; Olesen et al., 2013). Amid this literature, the results from this chapter show that, even among men with similar (greater) needs for mental health care, employed men are less likely to access publicly funded mental health care options than non-employed men.

Among those reporting greater depressive symptoms, younger men aged 18–24 years were 6–10 percentage points less likely than older men to access any mental health care two years after interview. This may reflect the young adulthood stage of the life course and a developing familiarity with professional help and mental health care from adolescence (Butterworth et al., 2021).

Those in the TTM sample with higher conformity to masculine norms were less likely to access health care than men with lower conformity to masculine norms, in line with research showing these men also had lower health literacy (Milner et al., 2019). Men who were classified as experiencing functional difficulty and/or disability were between 10–12 percentage points more likely to access mental health care. Men reporting greater depressive symptoms with greater conformity to masculine norms or who were from CALD backgrounds were 6 percentage points less likely to access mental health care within two years.

Levels of mental health service use did not seem to change for men during the COVID period between January 2020 and January 2021. Through this first year of the pandemic, mental health service usage appeared to be at levels similar to 2018 and 2019, suggesting that mental health care was sustained in the context of stay-at-home lockdown restrictions. However, the mode of these health services changed for some men; the number of in-person mental health services dropped beginning from March 2020 as more men used telehealth services, which had been made more broadly available following the introduction of COVID-19 into Australia. MBS data also showed an uptake in mental health care during the first year of COVID-19 by men who had not been in contact with such services for nearly a decade (or never); just over one in five (22%) men using mental health services after 30 March 2020 had not accessed mental health services at least since 2012. Thus, while levels of mental health service usage remained mostly steady through the onset of the COVID-19 pandemic, early evidence from the TTM survey and linked data suggest that many men were accessing Commonwealth-funded help for the first time.

Informing policy

Overall, the findings presented in this chapter could help inform future policies. Evidence from the statistical modelling indicates that younger age, employment and a CALD background were all associated with non-access of mental health care funded under the MBS and PBS, even after reporting greater depressive symptoms. In consideration of previous literature, these findings may reflect low levels of health literacy, limited service availability and accessibility, experience of stigma and unfamiliarity with the health care system (Chatmon, 2020; Gulliver, Griffiths, & Christensen, 2010; Lynch, Long, & Moorhead, 2018; Roche et al., 2016). For example, a systematic review of the impact of mental-health-related stigma on help seeking found that young people, men and ethnic minorities were all disproportionally deterred from help seeking for mental health problems by associated stigma (Clement et al., 2015). Targeted initiatives could aim to combat such barriers and lead to increased engagement with relevant services among these groups.

Being employed was also associated with non-utilisation of MBS and PBS services for mental health among TTM participants. Research has pointed to significantly higher levels of depression among workers specifically in male-dominated industries, highlighting a need to address the mental health of such workforces (Roche et al., 2016). Addressing structural barriers to mental health care for employed men may be beneficial for this group; the workplace could provide opportune settings to develop and deliver appropriate interventions for working males.

Future research opportunities

Men's use of services for their health needs, including for mental health, remains a public health priority. The findings presented in this chapter relate primarily to the use of mental health services and pharmaceuticals funded under the MBS and PBS; it is likely that some participants may have accessed mental health care through primary health network-commissioned mental health and suicide prevention services, in addition to publicly funded state/territory mental health services. Therefore, the estimates provided here regarding use of mental health services are more detailed than has previously been available but also somewhat conservative given the scope of the linkage. Future research could aim to explore patterns of non-MBS and PBS service access relating to mental ill-health among Australian males over time and how barriers and enablers differ between service types.

Future research using subsequent releases of TTM data can bring more insight into men's mental and other health needs and service use throughout the rest of the COVID-19 pandemic, and after. This may help evaluate the broader and longer-term implications of COVID-19, including lasting impacts of lockdown restrictions, and whether men continue to engage health professionals via telehealth. The available data could also be used to examine how men in priority groups (e.g. those residing in regional areas, Aboriginal and/or Torres Strait Islander men, those living with disability) have engaged with the health care system following COVID-19.

Research opportunities using Medicare data linked to the TTM survey are plentiful, extending well past the focus on mental health in this chapter. Investigations into primary care access, many categories of specialist services and prescription medication usage relating to different health conditions (including some measured in the TTM survey) may be feasible with the data from the MBS and PBS. Extensions to this chapter considering the timing between GP consultation and any subsequent specialist service or medication may also yield new findings on Australian men's health behaviours and outcomes. Further investigations relating to mental health may explore levels of MBS service use and PBS prescription access for mental health among Australian males by experience of self-injury and suicidality.

The analyses in this chapter examined and identified significant patterns in Australian men's access of mental health care, both over time and by key characteristics. While the analyses did not identify causal factors, the significant differences in men's health care access could motivate further research to explain why these patterns and differences arise. Additionally, since mental health is complex and needs can differ between individuals, this chapter does not evaluate whether certain health care outcomes are (in)adequate. Future work using the TTM survey and linked Medicare data may consider the causal pathways behind mental health/health care, and the extent to which health care adequately meets the needs of Australian men.

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TEN to MEN

The Australian Longitudinal Study on Male Health

Chapter 3

Illicit substance use among adult males in Australia, 2013/14–2020/21

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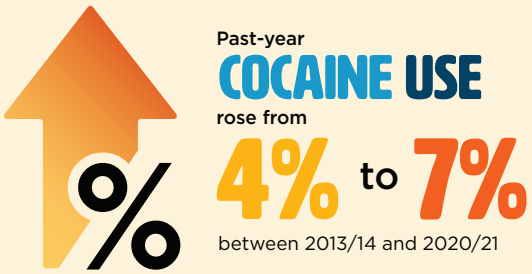
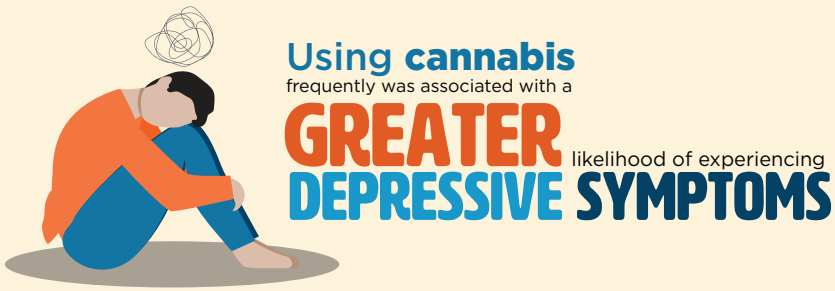
Key messages

- Prevalence of past-year cocaine use among adult Australian males rose significantly from 4% to 7% between 2013/14 and 2020/21. This change appeared to be driven by an increase in use among younger men (<35 years).



- Prevalence of past-year cannabis, ecstasy and meth/amphetamine use remained relatively stable across the same time period among adult males at 17%, 3%–5% and 3%–4%, respectively.
- Recent use of cocaine among Australian men was associated with younger age, living in major cities (vs non-metropolitan areas) and living in households with greater combined incomes.
- Frequent (weekly or more) cannabis use was associated with higher average depressive symptoms, irrespective of age and related factors, when compared to men who reported no usage in the previous 12 months.



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Overview

Australia has one of the highest rates of illicit drug-related burden in the world (GBD 2016 Alcohol and Drug Use Collaborators, 2018). In 2018, 3% of total disease burden in Australia was attributed to illicit drug use (Australian Institute of Health and Welfare [AIHW], 2021). Use of illicit drugs is more common among Australian males than females. In 2019, an estimated 17.5% of Australian males aged 14 and above had used one of 12 illegal drugs in the past year, compared to 10.7% of females (AIHW, 2020). National data also indicate that recent rises in the prevalence of use of certain drugs, such as cocaine, have been driven by increased usage rates among males. For example, in 2019, an estimated 13% of Australian males aged 14 and over had used cocaine in the past year (up from 10% in 2016), compared to 9% of Australian females in the same age group (up from 8% in 2016) (AIHW, 2020).

Higher rates of drug use among males mean they experience more associated harms. In 2018, males experienced more than twice the total burden associated with illicit drug use than females aged up to 84 years (AIHW, 2021). More specifically, research has shown that Australian males experience more than double the rate of disability-adjusted life years associated with drug use disorders than females (Ciobanu et al., 2018), and a higher percentage die from unintentional drug-induced overdoses involving numerous drug types, including cannabinoids, benzodiazepines, antipsychotics, stimulants and heroin (Penington Institute, 2021). Mental ill-health is also relatively common among Australian males who use drugs (Australian Bureau of Statistics, 2022; AIHW, 2020; Forsythe & Adams, 2009). In consideration of this, along with looking at illicit drug use, this chapter will also explore whether the use of cannabis – one of the most commonly used illicit drugs – is an effect on the experience of mental ill-health (specifically, experiencing depressive symptoms) over time (see below).

Identifying the characteristics of individuals and population subgroups who use different drugs is important for informing targeted prevention, education and harm reduction approaches. However, much of the research on illicit drug use in Australia is cross-sectional or serial cross-sectional in nature, which precludes the comprehensive investigation of causal associations and changes in drug use and the experience of harms over time. Many drug use studies in Australia also comprise relatively small samples recruited from treatment settings, meaning findings are not representative of community-based people who use drugs.

The prospective design and representative nature of *Ten to Men* (TTM) affords novel opportunities to examine drug use patterns over time among a sample broadly reflective of Australian adult males. Furthermore, determining trajectories of drug use among certain population subgroups, and factors associated with the progression to – or maintenance of – more harmful patterns of use, could help in identifying optimal points in drug use cycles to intervene and interrupt transitions to more harmful use patterns.

This chapter aligns with Australia's current National Drug Strategy's (Department of Health, 2017) priority relating to developing and sharing data, including the monitoring of existing and emerging drug issues to provide advice to health, law enforcement, education and social services sectors for informing individuals and the community regarding risky behaviours.

Comparisons are made in this chapter between drug use estimates using TTM data and those from Australia's National Drug Strategy Household Survey (NDSHS; AIHW, 2014, 2017, 2020). This provides further insight into the prevalence and patterns of illicit drug use among adult Australian males through confirming trends observed in TTM data, such as a significant increase in the prevalence of cocaine use in recent years. Such comparisons can also provide insight into aspects of drug use that TTM is unable to provide; for example, due to a lack of TTM participants reporting use of certain drugs, such as heroin. Likewise, the longitudinal nature of TTM (vs the serial cross-sectional design of the NDSHS), in addition to the administration of survey instruments that collect detailed socio-demographic, psychosocial and behavioural information from TTM participants, can aid in providing a more comprehensive picture of drug use among Australian men over time than that provided by NDSHS data alone. The collection of data on TTM participants' substance use patterns during COVID-19-related restrictions in Australia also provides an opportunity to explore changes to drug consumption associated with a unique and widespread public health event.

In focus: The longitudinal relationship between cannabis use and depression

Depression is one of the most common mental disorders experienced worldwide (World Health Organization [WHO], 2017). The most recent estimates suggest that, in 2019, there were around 280 million global cases of depressive disorder, of which around 109 million (39%) were male (GBD 2019 Mental Disorders Collaborators, 2022). Cannabis is the world's most commonly used illicit drug; the United Nations Office on Drugs and Crime (UNODC) estimated that almost 4% of the global population aged 15–64 used cannabis at least once in 2019 (around 200 million people) (UNODC, 2021). Research shows that cannabis consumption and the experience of depression commonly co-occur (Aspis et al., 2015; Degenhardt, Hall, & Lynskey, 2003). With increasing legalisation of medicinal and recreational cannabis use and cultivation worldwide, in addition to enhanced cannabis potency in illicit markets (Chandra et al., 2019; UNODC, 2021), there is a need to understand the possible adverse consequences of cannabis use, including the prevalence of, and associations with, mental health outcomes for different use patterns (e.g. infrequent/'recreational' vs heavy/chronic), using well-characterised, longitudinal data.

Research has shown that people who experience mental ill-health, such as anxiety and depression, may use licit (legal medical/medicinal and recreational forms) and/or illicit cannabis to self-medicate or -treat associated symptoms (Asselin et al., 2022; Brodbeck, Matter, Page, & Moggi, 2007; Kosiba, Maisto, & Ditre, 2019; Wallis et al., 2022). Longitudinal research findings relating to the development of depression from cannabis have been inconsistent, however. Lev-Ran and colleagues' (2013) systematic review and meta-analysis of such studies (N = 14) showed that people who used the drug were significantly more likely to develop depression compared with those who did not use cannabis, as were those who used it 'heavily'. However, Lev-Ran and colleagues noted that caution should be taken in interpreting findings due to inconsistent statistical adjustment for possible confounding variables across the reviewed studies. More recent systematic reviews taking subsequent research into account have found limited evidence of a longitudinal association between cannabis use and developing depression but have recommended further investigation (Feingold & Weinstein, 2021; National Academies of Sciences Engineering and Medicine, 2017; WHO, 2016). Additional gaps in the existing literature on cannabis use and depression include few such investigations in Australia and a predominant focus on cannabis use and depressive outcomes among younger adults (i.e. <30 years) (Gobbi et al., 2019; Lev-Ran et al., 2013; Womack, Shaw, Weaver, & Forbes, 2016). The collection of self-report information on cannabis use among TTM participants over the first three data collection waves provides an opportunity to address these gaps.

Research objectives

This chapter uses data from Waves 1, 2 and 3 of TTM to detail the use of illegal substances among males in Australia who were aged 18–57 at Wave 1 (2013/14), and to investigate changes in drug use among this group over time. Specifically, it aimed to:

1. detail the prevalence and frequency of use of:
    a. cannabis, ecstasy [3,4-methylenedioxy-methamphetamine (MDMA)], meth/amphetamine ('speed' powder and crystal methamphetamine/'ice') and cocaine among adult Australian males across three time points (2013/14, 2015/16 and 2020/21), and compare to prevalence estimates from the National Drug Strategy Household Survey (NDSHS; AIHW, 2020) for the same period
    b. ketamine, steroids and GHB, hallucinogens, inhalants, synthetic cannabis, anabolic steroids and heroin among Australian men in 2020/21 (because items regarding these substances were first included in the Wave 3 survey).
2. investigate the effect of cannabis use on the experience of depressive symptoms over time
3. identify socio-demographic and psychosocial factors associated with past-year cocaine use among adult males.

Box 3.1: Names and aliases for key drugs in Australia

Individual drugs have various names and aliases, which can differ due to factors including geographical location (e.g. between states/territories) and population subgroup. Given this, when TTM participants across the country are surveyed about their drug use at each data collection wave, alternative names are supplied for each drug to ensure responses are as accurate as possible.

The following terms were used to refer to different drug types in the Wave 3 survey:

- Cannabis/marijuana: grass, hash, dope, weed, pot, joint.
- Heroin: smack, horse, H, hammer, gear, junk.
- Ice/crystal methamphetamine: shard, tina.
- Meth/amphetamine: speed, powder, whiz, goey.
- Ecstasy: bickies, X, ecci, E, XTC, MDMA, Ex, Eccy.
- GHB: G, GBH, juice, liquid e, liquid x.
- Ketamine: K, special K, ket.
- Inhalants: chroming, sniffing, solvents, glue, petrol, poppers.
- Synthetic cannabis: spice, kronic, northern lights, blue lotus, K2.
- Anabolic steroids (non-medical use): Deca, Nandrolone, Ostarine, Ligandrol, Nurtabol

Method

This section describes the key measures and data analysis techniques used to address the above objectives. Information regarding the overall methodology of the TTM study is detailed elsewhere (e.g. Bandara, Howell, Silbert, & Daraganova, 2021; Swami et al., 2022).

Measures

Drug use

TTM participants have been surveyed about their use of licit and illicit substances at each data collection wave. Questions varied over the first three waves with regard to the types of drugs participants were surveyed about:

- *Wave 1 (2013/14)*: Cannabis/marijuana, 'amphetamines' (speed, crystal methamphetamine/ice), ecstasy, cocaine, heroin, other opiates (methadone, morphine, pethidine) for non-medical reasons.
- *Wave 2 (2015/16)*: Cannabis/marijuana, amphetamines (speed, crystal methamphetamine/ice), ecstasy, cocaine.
- *Wave 3 (2020/21)*: Cannabis/marijuana, ice/crystal methamphetamine, other meth/amphetamine (speed and other forms), cocaine, ecstasy, GHB, hallucinogens, heroin, inhalants, ketamine, synthetic cannabis, other psychoactive/synthetic drugs, non-medical use of anabolic steroids. Participants were also able to nominate 'other' drugs they had ever and recently used.

At Waves 1 and 2, adult TTM participants were asked how many times (frequency) they had used each drug in the past year and during their lifetimes.

At Waves 1 and 2, participants were asked about their use of 'amphetamines', which included all meth/amphetamine types such as speed and crystal methamphetamine/'ice'. At Wave 3, participants were asked if they had used each of crystal methamphetamine/ice or other meth/amphetamine, which predominantly includes 'speed' powder in Australia (Australian Crime Intelligence Commission [ACIC], 2021; Scott, Caulkins, Ritter, Quinn, & Dietze, 2015). These two groups were combined to generate the 2020/2021 meth/amphetamine figures presented here.

At Wave 3, participants were asked whether they had ever used different drug types, the age they first used each drug, frequency of drug use in the past year, and frequency of drug use in the past four weeks.

Table S3.1 in the supplementary materials lists the drug types asked of adult TTM participants at each data collection wave. The TTM data dictionary and study questionnaires, available at tentomen.org.au, also provide the exact questions and information collected from TTM participants relating to illicit drug use.

Comparisons with national estimates

Australia's NDSHS is a triennial, national, serial cross-sectional survey of alcohol and other substance use (AIHW, 2020). National prevalence estimates for use of cannabis, cocaine, ecstasy and meth/amphetamine among Australian males were calculated from NDSHS datasets from surveys undertaken in 2013, 2016 and 2019, which corresponded somewhat with Waves 1–3 of TTM (2013/14, 2015/16 and 2020/21, respectively). Tables S3.2–S3.5 in the supplementary materials provide estimates with 95% confidence intervals for the following age categories calculated from TTM and NDSHS: 18–24, 35–44, 45–54 and 55–64 years.

Depression

Experience of depressive symptoms during the two-week period prior to interview was assessed among adult TTM participants at each wave using the Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001). The total continuous PHQ-9 score range is 0–27, with higher scores indicating greater experience of depressive symptoms. Cut points allow for the classification of respondents into five different depression categories: No or minimal depression (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe depression (20–27).

PHQ-9 findings for Waves 1 and 2 of TTM have been published previously (e.g. Swami, Prattley, Terhaag, Rowland, & Quinn, 2021; Terhaag, Quinn, Swami, & Daraganova, 2020; Van Doorn, Teese, & Gill, 2021), and chapter 2 of this report provides further detail on the distribution of PHQ-9 scores/depression categories among the TTM cohort over Waves 1–3.

Analysis

Survey data from the first three waves of TTM (2013/14, 2015/16 and 2020/21; i.e. all available waves at the time of writing) were used in analyses to address the research objectives. Specific analytical approaches to address each objective are outlined below.

Objective 1

Descriptive analyses investigated and compared the estimated prevalence and uptake of cannabis, cocaine, ecstasy and meth/amphetamine use among adult Australian males who were initially aged 18–57 in 2013/14 (i.e. they comprised the 'adult' sub-cohort of the TTM sample at Wave 1/recruitment) at each of the three data collection time points. For these analyses, prevalence statistics provided in relation to these four drugs were derived from a 'balanced' sample to enable comparisons between time-points among the same group of men; that is, adult TTM participants who provided valid self-report data regarding their lifetime and past-year use of these specific drugs at all three waves of data collection between 2013 and 2021. Significant changes in prevalence of use across each wave were determined by non-overlapping 95% confidence intervals (refer to Table 3.1).

Use frequency estimates and age statistics for males who used each of these four drugs in 2020/21 were calculated using survey responses from all participants who provided valid data at Wave 3.

Prevalence estimates for the use of cannabis, cocaine, ecstasy and meth/amphetamine according to both TTM and NDSHS were calculated for each time period by age group (see Tables S3.2–S3.5 in the supplementary materials). These estimates were not from a balanced TTM sample; i.e. all participants with

valid data at each wave were included, regardless of their participation status at other waves. This was to enhance comparability with the NDSHS which has a serial cross-sectional study design. All TTM estimates were calculated using raked cross-sectional population weights; 2011 census-based Statistical Areas Level 1 (SA1) and Australian Statistical Geography Standard (ASGS) codes were used for Wave 1, and 2016 census-based SA1 and ASGS codes for Waves 2–3. All estimates are presented for completeness but some have a degree of uncertainty due to relatively small sample sizes (cell sizes of $n < 50$ are indicated by '#' in these tables). The true difference between estimates obtained from TTM and NDSHS may therefore vary from that reported here.

Descriptive statistics were also calculated to determine the prevalence of use of GHB, hallucinogens, ketamine, inhalants, synthetic cannabis, anabolic steroids and heroin in 2020/21.

Objective 2

Bivariate analyses were first undertaken to investigate cross-sectional associations between cannabis use and the experience of depressive symptoms at each data collection wave. Three sequential multivariable growth curve models[1] were then developed to examine the effect of recent cannabis use frequency on depression over time (using age in years as a proxy for time), with the second and third models controlling for key socio-demographic and psychosocial factors:

- Time-variant control factors/variables (i.e. those measured at multiple time points) included residential location, employment status, highest level of education, level of personal wellbeing, cigarette smoking status and relationship status.
- Time-invariant control factors/variables (i.e. those measured at baseline/Wave 1, as defined above) included Aboriginal and Torres Strait Islander identity, country of birth (Australia vs elsewhere), culturally and linguistically diverse status, sexual identity and level of conformity to masculine norms.[2]

The first (Model 1) established the relationship between depression (continuous PHQ-9 score) and age (a proxy for time). Model 2 controlled for the socio-demographic and psychosocial variables listed above. The final model (Model 3) incorporated the main variable of interest; namely, frequency of marijuana use, and included an interaction term between marijuana use and age.

Likelihood ratio tests were used to compare models. To account for the inter-correlation and clustering of repeated measures for individual participants, a random intercept for individuals using participants' unique identifier was included in the model. The random intercept also accounts for participants experiencing different levels of depressive symptoms at baseline.

Objective 3

A bivariate model was first developed to determine whether there was an unadjusted association between age (a proxy for time) and use of cocaine in the past year. A multivariable multilevel mixed-effects logistic regression model was then generated to investigate key socio-demographic and psychosocial factors associated with past-year cocaine use among adult TTM participants over this period.

Time-variant factors included in the model were: household income, residential location, highest level of education, personal wellbeing, employment status and relationship status.

Time-invariant factors included Aboriginal and Torres Strait Islander identity, country of birth (Australia vs elsewhere), culturally and linguistically diverse status and sexual identity.

1 Publications such as those by Graham, Singer and Willett (2008) and Peugh (2010) provide further technical information on growth curve models.

2 Conformity to traditional masculine norms was measured using the Conformity to Masculine Norms Inventory (CMNI). The CMNI comprises 22 items; total scores range from 0–66, with higher scores indicating greater adherence to masculine norms (Mahalik et al., 2003).

Findings

Drug use prevalence

Drug use prevalence 2013–20: Cannabis, cocaine, ecstasy, meth/amphetamine

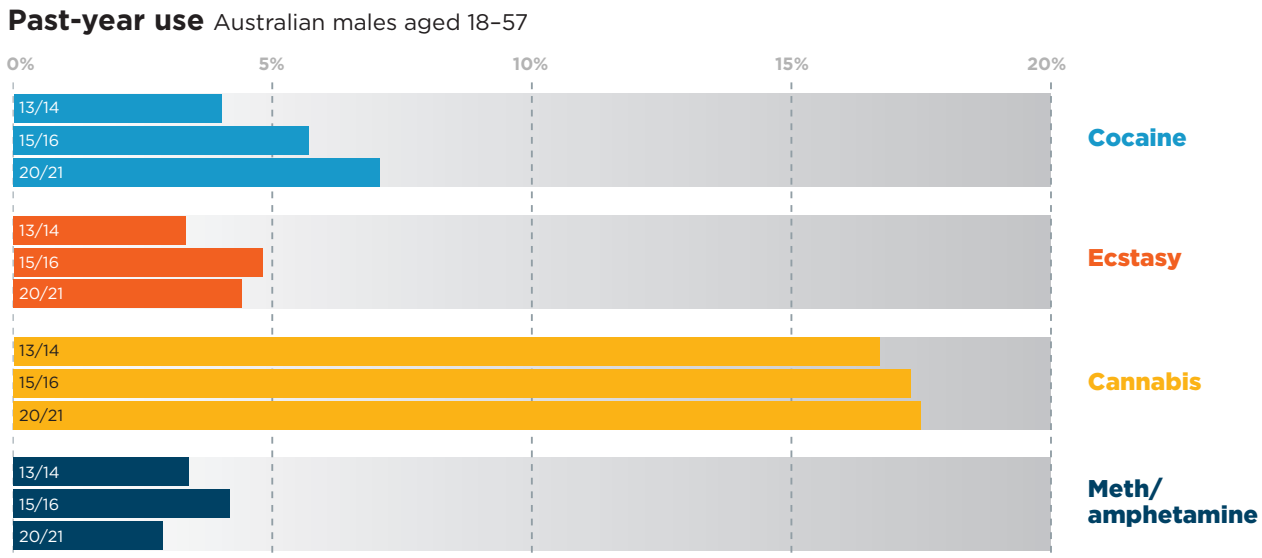
The prevalence of past-year use of four key illicit drugs – cocaine, ecstasy, cannabis and meth/amphetamine – at three time points between 2013 and 2021 among Australian males who were initially aged 18–54 years in 2013/14 (Wave 1 of TTM) is detailed in Table 3.1. Findings regarding each of these four drugs are detailed in subsections below. Prevalence statistics provided throughout much of this section were derived from TTM participants who provided valid self-report data regarding their lifetime and past-year drug use at all three waves of data collection between 2013 and 2020; exceptions include estimates relating to drug use frequency and the age of people using drugs in 2020/21.

Table 3.1: Lifetime use and past-year prevalence (%) of cocaine, ecstasy, cannabis and meth/amphetamine use among Australian males aged 18–57 in 2013/14

	Lifetime use, Wave 1		Past-year use, Waves 1–3					
	2013/14		2013/14		2015/16		2020/21	
Drug	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Cocaine (*n* = 5,981)	11.9	[10.6, 13.2]	3.8	[3.1, 4.7]	5.4	[4.6, 6.4]	6.7	[5.8, 7.8]
Ecstasy (*n* = 5,856)	15.4	[14.0, 17.0]	3.4	[2.7, 4.4]	4.9	[3.9, 6.1]	4.5	[3.6, 5.7]
Cannabis (*n* = 5,148)	54.3	[52.1, 56.5]	16.6	[14.9, 18.4]	17.2	[15.6, 19.0]	17.4	[15.9, 19.0]
Meth/ amphetamine (*n* = 5,590)	12.8	[11.5, 14.2]	3.4	[2.7, 4.2]	4.2	[3.4, 5.1]	2.9	[2.3, 3.8]

Notes: Participants were excluded if they did not have valid drug use data for all three waves.

Source: TTM data, Waves 1–3, adult cohort, balanced sample for each individual drug, weighted



Cannabis

Of the illicit substances examined across all three waves of TTM (see Box 3.1), cannabis was the most commonly used among adult Australian men between 2013/14 and 2020/21 (Table 3.1).

In 2013/14, over half (54%) of Australian males aged 18–57 were estimated to have ever used cannabis. A further 6% of males in this age group initiated cannabis use over 2013–20/21.

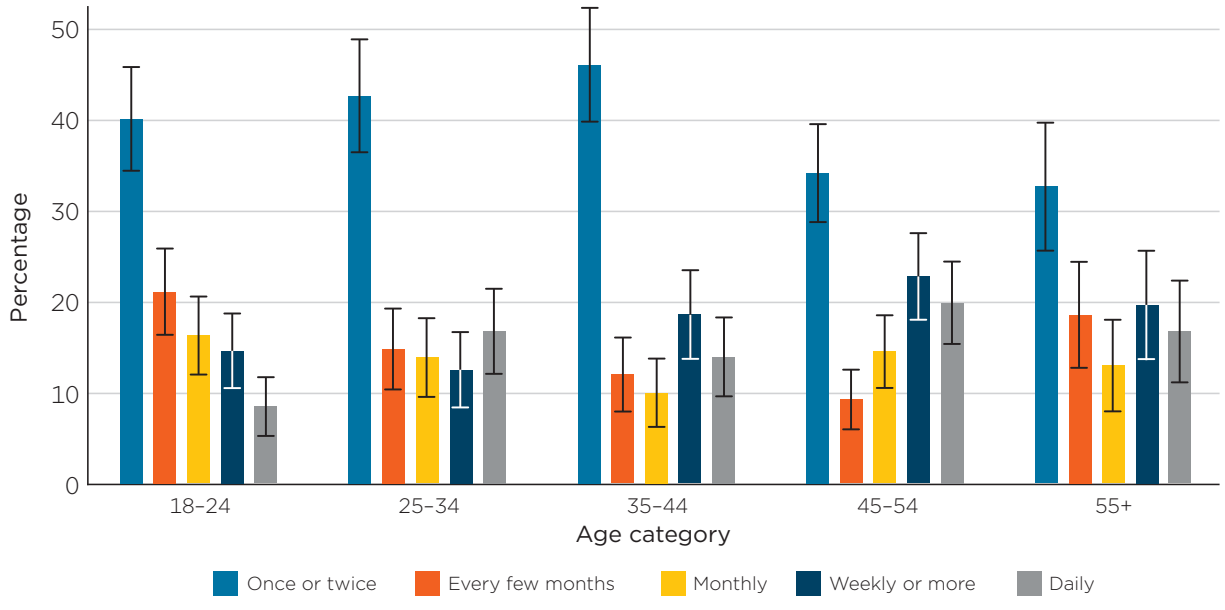
The prevalence of past-year cannabis use among this group remained relatively stable between 2013/14 and 2020/21; around 17% of Australian males who were aged 18–57 in 2013/14 were estimated to have engaged in past-year use of cannabis at three time points over this period.

Cannabis use in 2020/21

In 2020/21, most Australian men aged 18–63 who had used cannabis in the past year had done so infrequently; overall, around 40% had used the drug once or twice in the past year, and 16% had done so every few months. Figure 3.1 shows that infrequent use (once/twice per year) was the most common cannabis consumption pattern among this group regardless of age. Nevertheless, older Australian men who had used cannabis in the past year reported more frequent consumption patterns than younger men; for example, around one-fifth (20%) of males aged 45–54 who had used cannabis in the past year did so on a daily basis, compared to about 8% of those aged 18–24.

The average age of Australian men aged 18–63 who used cannabis in the past year was 34 (*SD* = 12.5). In 2020/21, approximately 10% (95% CI [9.2, 11.4]) of Australian males aged 18–63 were estimated to have used cannabis in the past four weeks.

Figure 3.1: Estimated frequency of cannabis use in the past year among Australian men aged 18–63 who had recently used the drug in 2020/21, by age group



Notes: *N* = 1,265 adult TTM participants who provided valid cannabis use data in 2020/21. 95% confidence intervals.
Source: TTM data, Wave 3, weighted

Cocaine

In 2013/14, an estimated 12% of adult Australian males aged 18–54 had used cocaine at least once during their lifetimes. A further seven percent initiated cocaine use (i.e. used it for the first time) between 2013/14 and 2020/21.

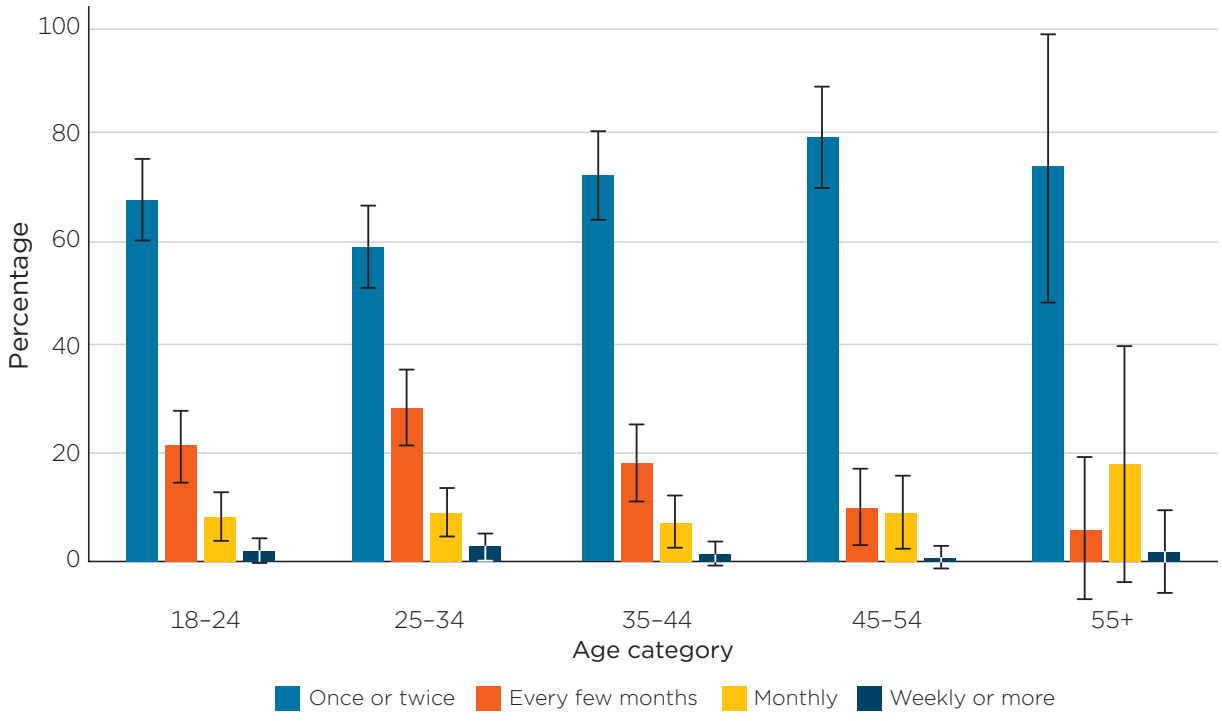
Of the four illicit drugs TTM participants were surveyed about at the first three waves of TTM, cocaine was the only one to see a significant change in prevalence of past-year use among Australian men between 2013/14 and 2020/21; estimated past-year consumption of cocaine increased from around four percent of men aged 18–54 in 2013/14, to approximately seven percent of this group in 2020/21 (Table 3.1).

Cocaine use in 2020/21

As indicated below in Figure 3.2, in 2020/21, Australian men aged 18–63 typically used cocaine infrequently, regardless of age. Overall, the majority of men who had used cocaine in the past year had used it only once or twice (67%) or every few months (23%). Around 10% used the drug at least monthly. No TTM participants reported using cocaine on a daily basis in 2020/21.

Among men aged 18–63 in 2020/21, the average age of those who had used cocaine in the past year was 31 years (*SD* = 9.7). Around 3% (95% CI [2.1, 3.2]) of Australian men aged 18–63 were estimated to have used cocaine in the past four weeks in 2020/21.

Figure 3.2: Estimated frequency of cocaine use in the past year among Australian men aged 18–63 who had recently used the drug in 2020/21, by age group



Notes: *N* = 506 adult TTM participants who provided valid cocaine use data in 2020/21. No participants reported daily cocaine use at Wave 3.

Source: TTM data, Wave 3, weighted

Ecstasy

In 2013/14, around 16% of Australian males aged 18–54 were estimated to have ever used ecstasy. A further 5% of males in this age group initiated ecstasy use over 2013–2020/21.

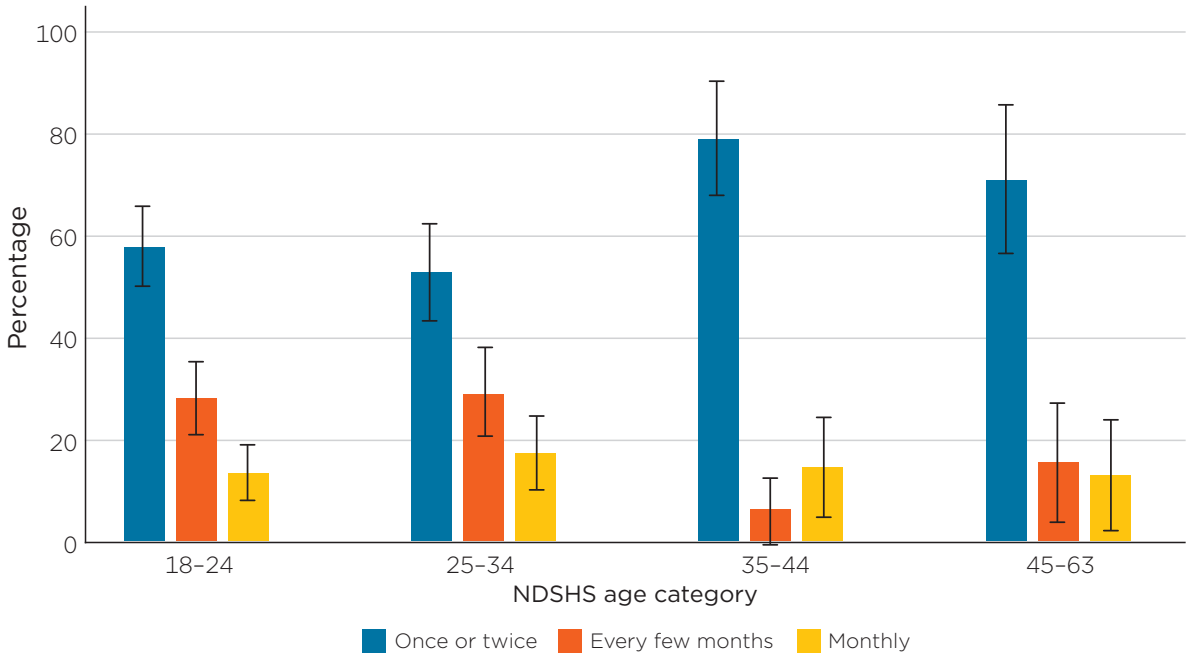
The prevalence of past-year ecstasy use among this group remained relatively low and stable between 2013/14 and 2020/21; as shown in Table 3.1, around 3%–5% of Australian males who were aged 18–54 in 2013/14 were estimated to have engaged in past-year use of ecstasy at three time points over this period.

Ecstasy use in 2020/21

Figure 3.3 shows that, in 2020/21, the majority of Australian men aged 18–63 who had used ecstasy in the past year used it infrequently; overall, 59% (95% CI [50.3, 66.6]) had only used it once or twice, and 27% (95% CI [20.2, 34.8]) every few months. Fourteen per cent (95% CI [9.5, 21.3]) of men who had used ecstasy in the past year had consumed it monthly or more often during that time but not daily.

Among men aged 18–63 in 2020/21, the average age of those who had used ecstasy was 28 years (*SD* = 8.7). Approximately 2% (95% CI [1.1, 2.1]) of Australian males aged 18–63 were estimated to have used ecstasy in the past four weeks in 2020/21.

Figure 3.3: Estimated frequency of ecstasy use in the past year among Australian men aged 18–63 who had recently used the drug in 2020/21, by age group



Notes: *N* = 355 adult TTM participants who provided valid ecstasy use data in 2020/21. No participants reported weekly or daily ecstasy use at Wave 3.

Source: TTM data, Wave 3, weighted

Meth/amphetamine

In 2013/14, around 13% of Australian males aged 18–54 were estimated to have ever used meth/amphetamine. A further 3% of males in this age group initiated meth/amphetamine use over 2013–2020/21.

The prevalence of past-year meth/amphetamine use among Australian men remained relatively low and stable between 2013/14 and 2020/21. As shown in Table 3.1, around 3%–4% of Australian males who were aged 18–54 in 2013/14 were estimated to have engaged in past-year use of meth/amphetamine at three time points over this period. There were no significant differences in estimated prevalence of meth/amphetamine use at each time point.

Meth/amphetamine use in 2020/21

Estimated frequency of use of crystal methamphetamine/ice and other meth/amphetamine[3] are reported separately here because, as the TTM sample was asked about recent consumption of each of these meth/amphetamine forms separately at Wave 3, in the event of participants using both forms it was not possible to determine overall frequency of any meth/amphetamine use.

In 2020/21, use of other meth/amphetamine among Australian men aged 18–63 who had used the drug in the past year was mainly infrequent. An estimated 69% (95% CI [55.3, 79.6]) of this group had used other meth/amphetamine only once or twice; a further 12% (95% CI [6.8, 20.6]) used it every few months. In comparison, an estimated 11% (95% CI [5.1, 22.0]) of Australian men used other meth/amphetamine about monthly, 7% (95% CI [2.1, 21.8]) 2–3 times per month, and 1.1% (95%CI [0.3, 4.0]) about once per week.

Estimated frequency of crystal methamphetamine/ice use in 2020/21 among Australian men who used the drug was higher than that for other meth/amphetamine. Around 41% (95% CI [25.2, 59.2]) of men who had used crystal methamphetamine/ice in the past year had used it only once or twice during that time, and a further 17% (95% CI [7.2, 35.7]) used it every few months. In comparison, 11% (95% CI [4.3, 24.1]) used it about monthly, 11% (95% CI [4.0, 25.4]) 2–3 times per month, 11% (95% CI [5.2, 21.5]) about once per week, and a further 10% (95% CI [3.5, 23.7]) every day.

In 2020/21, approximately 1% (95% CI [0.5, 1.0]) of Australian males aged 18–63 were estimated to have used meth/amphetamine in the past four weeks.

Drug use prevalence in 2020/21: GHB, hallucinogens, ketamine, inhalants, synthetic cannabis, anabolic steroids, heroin

Table 3.2 lists the lifetime and recent prevalence of use of other illicit substances among adult Australian males aged 18–63 in 2020/21, including GHB, hallucinogens generally (including LSD and magic mushrooms), inhalants generally (including glue, amyl nitrite and nitrous oxide), ketamine, steroids and synthetic cannabis. It also details age of first use/initiation and frequency of use of these drugs in the past year and past four weeks. TTM participants were asked about these drugs for the first time in 2020/21, and low numbers of participants reporting use of each drug type generally prevented further analyses beyond the descriptive statistics shown in Table 3.2.

Of the different drug types, hallucinogens were estimated to be the one most commonly used among Australian males aged 18–63 in 2020/21; around 16% had ever used hallucinogens, and 5% had done so in the past year.

The next most commonly used drug was ketamine; in 2020/21, approximately seven percent of Australian men had used ketamine at least once during their lives, with around three percent having done so in the past year. Six percent had ever used inhalants, with two percent having done so in the past year. Fewer men had ever used synthetic cannabis (4%), GHB (2%), heroin (1%) and steroids (1%).

3 Given official seizure data in recent years, it is likely that the predominant form of 'other' meth/amphetamine used by Australian men over the data collection period was 'speed' powder (ACIC, 2021; Scott et al., 2015).

Of the substances listed in Table 3.2, the youngest average age of initiation (around 21 years) was recorded for inhalants and hallucinogens. Inhalants were also the most frequently used drug type; around one-fifth of males who had used inhalants in the last year had done so on at least a monthly basis, compared to 12% of those who had used ketamine in the past year and eight percent of those who had used hallucinogens during that time (note: the differences between frequency of use for each drug are not significant due to overlapping confidence intervals, likely a result of relatively small numbers of TTM participants reporting such drug use).

Not shown in Table 3.2 due to low numbers of TTM participants reporting use: among Australian men aged 18–63 in 2020/21, around one percent were estimated to have ever used heroin. The mean age of heroin initiation among this group was about 24 years (SD = 8.3). Only one TTM participant reported any past-year heroin use, and none reported use in the past four weeks. NDSHS estimates indicate that 3.8% of adult Australian males aged 14 and over had used any illicit opioid in the past year (including heroin, non-medical use of pain-killers/pain-relivers, and non-medical use of methadone and buprenorphine), of which 3.4% had used heroin (AIHW, 2020).[4]

Table 3.2: Lifetime, past-year and past-month illicit drug use prevalence (%) among Australian males aged 18–63 in 2020/21

	GHB % [95% CI]	Hallucinogens % [95% CI]	Inhalants % [95% CI]	Ketamine % [95% CI]	Steroids % [95% CI]	Synthetic cannabis % [95% CI]
Lifetime use	1.9 [1.5, 2.5]	15.9 [14.6, 17.4]	6.1 [5.2, 7.1]	6.6 [5.7, 7.7]	1.1 [0.7, 1.6]	4.3 [3.6, 5.1]
Mean age of first use, years (*SD*)[a,c]	25.4 (7.4)	21.0 (5.0)	20.5 (5.6)	23.5 (6.0)	25.4 (10.8)	27.5 (9.5)
Use in past year, all males	0.4 [0.3, 0.6]	5.1 [4.3, 6.0]	2.3 [1.8, 2.9]	2.5 [1.9, 3.1]	0.3 [0.2, 0.6]	0.3 [0.2, 0.5]
Use in past year, among those ever used	20.1 [12.7, 30.3]	31.9 [27.5, 36.7]	37.5 [29.0, 46.9]	37.2 [29.0, 46.3]	30.2 [15.5, 50.5]	6.8 [3.3, 13.5]
Frequency of past-year use[b]						
Once or twice	63.0 [35.7, 84.0]	72.0 [63.3, 79.3]	57.2 [44.2, 69.2]	69.1 [57.2, 78.8]	65.5 [29.9, 89.5]	76.6 [39.8, 94.2]
Every few months	20.1 [4.7, 56.1]	20.3 [13.9, 28.5]	22.1 [13.6, 33.7]	19.2 [11.2, 30.9]	34.5 [10.5, 70.1]	23.4 [5.8, 60.2]
Monthly or more	16.8 [4.6, 45.7]	7.8 [4.3, 13.8]	20.7 [11.8, 33.9]	11.8 [6.4, 20.6]	-	-
Use in past four weeks, among those ever used	7.1 [3.3, 14.8]	6.7 [4.5, 9.7]	15.0 [9.5, 22.9]	7.4 [3.9, 13.8]	12.6 [4.5, 30.8]	1.6 [0.4, 5.6]
Use in past four weeks, among those used in past year	35.5 [15.9, 61.6]	20.9 [14.3, 29.4]	40.1 [28.1, 53.5]	20.0 [11.5, 32.5]	41.9 [14.9, 74.7]	23.4 [4.1, 68.8]

Notes: *N* = 7,675. CI = confidence interval; SD = standard deviation. [a] Among those who had ever used the drug; [b] Among those who had used in the past year; [c] Numbers of missing responses ranged from *n* = 8 (steroids) to *n* = 31 (both GHB and hallucinogens).

Source: TTM data, Wave 3, adult cohort, weighted

4 Estimates have relevant standard errors of 25% to 50% and should be used with caution (AIHW, 2020).

Box 3.2: Illicit drug use among TTM participants during Stage 3 COVID-19 restrictions

At Wave 3 of TTM data collection (2020/21), participants were asked to report if their illicit drug use in general had increased, decreased or remained stable when Stage 3 restrictions related to COVID-19 were first implemented in Australia (March–May 2020). Of those who reported lifetime use of any of the drugs asked about at Wave 3 (see Table S3.1 in the supplementary materials) and who provided applicable responses to the COVID-19 items (n = 1,380), the majority (59%) reported that their use of illicit drugs had remained 'about the same'. In contrast, approximately 14% reported they were using 'more' (11%) or 'much more' (3%), whereas over one-quarter (28%) reported using drugs 'less' (8%) or 'much less' (20%). This should be considered when interpreting other findings from Wave 3 data in this chapter.

Other Australian research has similarly pointed to some effects of the coronavirus pandemic and related restrictions on drug use among certain subpopulations. For example, among a national, sentinel sample of people who recently used ecstasy and related drugs, interviewed between April and July 2020, 69% reported a change in the frequency of their use of such substances since the pandemic began, of which 75% had reduced or ceased their use (Peacock, Price, Dietze et al., 2020). In contrast, among participants in this sample who had used cannabis in the past year, nearly 40% reported that their use had increased following the commencement of the pandemic (Peacock, Price, Dietze et al., 2020).

Likewise, interviews between June and September 2020 with a national sample of adults who injected drugs suggested that drug market changes due to COVID-19 had resulted in reduced methamphetamine and heroin use (Peacock, Price, Karlsson et al., 2020). Frequently cited reasons for decreased or ceased drug use related to price and availability; for example, around 60% of participants who commented reported an increase in heroin price since the beginning of the pandemic, and 90% an increase in heroin use (Peacock, Price, Karlsson et al., 2020).

Findings from the Drug Use Monitoring in Australia program, which collects information about alcohol and drug use and criminal justice from police detainees at watch houses and police stations across the country (Voce, Sullivan, & Doherty, 2021), further pointed to COVID-19-related disruptions to methamphetamine supply nationwide; specifically, reduced availability and quality/purity as well as increased price, with a corresponding decrease in consumption levels. Geographic differences were observed around Australia, with greater disruption observed in Perth relative to Brisbane and Adelaide.

National data comparing drug-induced deaths over 2019–20 showed that the rate of drug-induced deaths in the third quarter of 2020 was lower than the rate in the first quarter of that year – that is, immediately prior to the pandemic onset – and in the third quarter of 2019 (Chrzanowska, Man, Sutherland, Degenhardt, & Peacock, 2022).

The effect of cannabis use on the experience of depressive symptoms over time

Participants also self-reported on their lifetime and past-year use of cannabis at the first three waves of TTM data collection (see Box 3.2).

Cross-sectional associations between cannabis use and experience of depressive symptoms at three time points

With regard to the distribution of PHQ-9 categories among adult TTM participants according to their baseline age (the age at which participants first responded to the TTM survey; i.e. Wave 1 in 2013/14), most of the sample (88%) was classified as having no or minimal depression. Prevalence of no–minimal depression did vary somewhat by age, ranging from 83% of participants aged 18–24 year to 89% among those aged 45–55. Rates of moderate depression reduced from 11% among 18–24 year olds to 7% among those aged 45–55; likewise, 6% of 18–24 year olds were classified as having severe or very severe depression compared to 4% of the oldest age group. Figure S3.6 in the supplementary materials provides a visual representation of these data.

Cross-sectional associations between PHQ-9 scores and past-year cannabis use among adult Australian males at each of the three waves of TTM data collection are presented in Table 3.3 and Figure 3.4. At each time point, there was a significant association between any use of cannabis in the past year with greater levels of depressive symptoms (Table 3.3). For example, at each wave, significantly more men who had engaged in past-year cannabis use were classified as experiencing moderately severe to severe depressive symptoms compared to those who had not used cannabis during that time. Conversely, significantly fewer men who had used cannabis in the past year were classified as experiencing no or mild depressive symptoms.

Likewise, average PHQ-9 scores were significantly higher among men who had used cannabis at least weekly at each time point compared to those who had used cannabis less than weekly or not at all (Figure 3.4).

Overall, depression levels associated with recent cannabis use increased over the three time points; the proportion of respondents with no depressive symptoms who had recently smoked cannabis decreased, while the proportion of respondents with moderate or moderately severe symptoms increased.

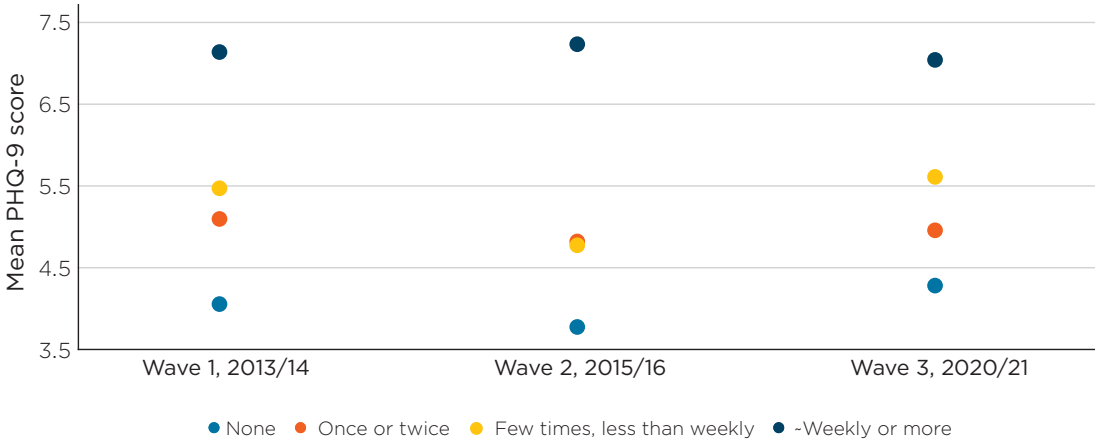
Table 3.3: PHQ-9 classification of depression in 2013/14, 2015/16 and 2020/21, by past-year use of cannabis, among Australian males aged 18–55 in 2013/14, % [95% CI]

	2013/14		2015/16		2020/21	
	Past-year cannabis use? *N* = 6,273		Past-year cannabis use? *N* = 6,403		Past-year cannabis use? *N* = 6,307	
PHQ-9 classification	No	Yes	No	Yes	No	Yes
No–mild depression	88.6 [87.2, 89.9]	80.4 [76.6, 83.8]	88.7 [87.4, 89.8]	81.4 [77.0, 85.2]	88.2 [86.9, 89.3]	74.7 [70.0, 79.0]
Moderate depression	6.9 [5.8, 8.1]	8.6 [6.7, 19.9]	7.5 [6.5, 8.6]	10.4 [7.4, 14.3]	6.8 [6.0, 7.8]	15.2 [11.6, 19.7]
Moderately severe–severe depression	4.5 [3.7, 5.5]	11.0 [8.2, 14.7]	3.9 [3.3, 4.7]	8.2 [5.9, 11.3]	5.0 [4.2, 5.9]	10.1 [7.7, 13.1]
χ^2	$p < 0.001$		$p < 0.001$		$p < 0.001$	

Notes: Participants were excluded if aged less than 18 years in Wave 1 or they did not participate at all three waves. PHQ = Patient Health Questionnaire.

Source: TTM data, Waves 1–3, adult cohort, balanced sample, weighted

Figure 3.4: Mean PHQ-9 score (range: 0–27) at each TTM data collection wave by frequency of past-year cannabis use among Australian males aged 18–55 in 2013/14



Notes: *N* > 6,273. Participants were excluded if aged less than 18 years in Wave 1 or they did not participate at all three waves.
Source: TTM data, Waves 1–3, adult cohort, balanced sample, weighted

Multivariable model: Cannabis use frequency and depression (PHQ-9 score)

Table 3.4 shows results from three sequential multivariable growth curve models developed to examine the effect of recent cannabis use frequency on depression over time, using age in years as a proxy for time.

The significant, consistent, negative association between age and PHQ-9 score (coef. < -0.02) across Models 1–3 indicates that, as TTM participants aged, their experience of depressive symptoms tended to be lower on average; that is, the average adult male TTM participant had a decreasing PHQ-9 score as they aged.

Model 3 shows that, on average, men who used cannabis had higher depression scores, irrespective of age or other confounding variables. Indeed, when compared with men who had no recorded cannabis usage in the past year, those who used cannabis weekly or more had – on average – a 1.52 point higher depression score, after adjustment for related factors. On the total PHQ-9 continuous scale ranging from 0–27, this represents an average difference of around 6%.

Importantly, there was no interaction found between cannabis use frequency and age, suggesting that the association between cannabis use frequency and depression was not influenced by the age of respondent.

Table 3.4: Multivariable growth curve model: Associations between cannabis use frequency and experience of depressive symptoms (continuous PHQ-9 score) among adult Australian males, controlling for key socio-demographic and psychosocial factors (*N* = 10,791)

Variables	Model 1		Model 2		Model 3	
	Coef.	Standard error	Coef.	Standard error	Coef.	Standard error
Age (continuous)	-0.03***	0.00	-0.02***	0.00	-0.02***	0.00
Frequency of cannabis use past year (ref. = none)						
Once or twice	-	-	-	-	0.74*	0.33
Few times, less than weekly	-	-	-	-	0.81*	0.37
Approx. weekly or more	-	-	-	-	1.52**	0.44
Interaction between time (age) and cannabis use frequency						
Once or twice	-	-	-	-	-0.01	-0.01
Few times, less than weekly	-	-	-	-	-0.01	-0.01
Approx. weekly or more	-	-	-	-	-0.01	-0.01
Aboriginal and/or Torres Strait Islander (yes)	-	-	0.25	0.24	0.22	0.24

Table continued over page ▶

Variables	Model 1		Model 2		Model 3	
	Coef.	Standard error	Coef.	Standard error	Coef.	Standard error
Non-Australian born	-	-	-0.42***	0.09	-0.41***	0.09
Culturally and linguistically diverse	-	-	-0.47**	0.15	-0.39**	0.15
Residential location (ref. = metropolitan)[a]						
Inner regional	-	-	0.07	0.08	0.07	0.08
Outer regional	-	-	-0.05	0.09	-0.04	0.09
Non-heterosexual	-	-	1.23***	0.16	1.20***	0.16
Highest level of education (ref. = Year 12 or less)						
Certificate/diploma	-	-	-0.04	0.07	-0.02	0.07
University degree	-	-	-0.34***	0.08	-0.31***	0.09
Personal wellbeing = middle-high (ref. = low)	-	-	-4.10***	0.06	-4.07***	0.06
Employment status (ref. = Employed)						
Unemployed and looking for work	-	-	1.46***	0.11	1.42***	0.11
Out of labour force	-	-	2.08***	0.12	2.04***	0.12
Conformity to masculine norms (low-medium vs high)[c]	-	-	0.46***	0.08	0.42***	0.08
Relationship status (ref. = never married)						
Widowed, divorced or separated	-	-	0.32*	0.13	0.37**	0.13
Married or de facto	-	-	-0.09	0.08	-0.03	0.08
Current cigarette smoker	-	-	0.61***	0.08	0.40***	0.08
Individual-level variance (*random parameter*)	13.29	0.25	7.32	0.18	7.28	0.18
Intercept	5.45***	0.13	8.11***	0.15	7.83***	0.16
Number of observations	22,088					

Notes: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; [a] Remote/very remote and 'other' education excluded ($n = 228$ total); [c] Measured using the 22-item CMNI (Mahalik et al., 2003). A likelihood ratio test comparing Models 2 and 3 was found to be non-significant ($p < 0.001$), meaning that adding cannabis use frequency to Model 2 significantly improved the fit of the final model.

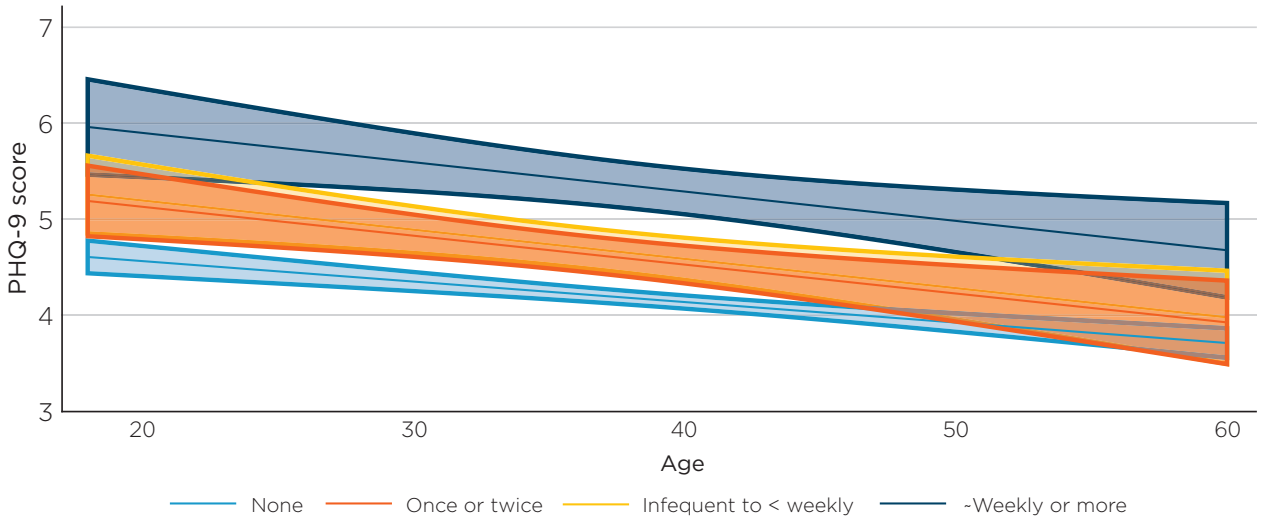
Source: TTM data, Waves 1–3, adult cohort, balanced sample

Figure 3.5 shows estimated or predicted PHQ-9 scores (with 95% confidence intervals) by age/time and cannabis use frequency for Model 3. The Figure shows that, overall, PHQ-9 scores decline with age, regardless of cannabis use; that is, experience of depressive symptoms decreases as men grow older. However, a significant, consistent difference was observed in predicted PHQ-9 scores between men who had not used any cannabis in the past year and those who used at the highest frequency category (approximately weekly or more) during that time. This means that adult Australian males who use cannabis at least weekly have an increased likelihood of experiencing greater depressive symptoms compared to those who do not use cannabis at all.

Also of note was the lack of difference in estimated PHQ-9 scores between men who had only used cannabis once or twice in the past year and those who used cannabis more often than this but less than weekly.

Among men younger than their mid-forties, those who used cannabis relatively infrequently were estimated to have significantly higher PHQ-9 scores than those who did not use the drug at all. Among men between their mid-twenties to around 50, those who used cannabis at least weekly were estimated to have significantly higher scores than those who used the drug less frequently. Taking PHQ-9 categories into consideration (Kroenke et al., 2001), this could be a difference between experiencing no/minimal depression (PHQ-9 score: 0–4) and mild depression (PHQ-9 score: 5–9).

Figure 3.5: Predictive margins of PHQ-9 score (with 95% CIs) by cannabis use frequency and age among Australian males aged 18–55 in 2013/14, *N* = 10,791



Notes: Figure is a graphical representation of statistics calculated from predictions of Model 3 in Table 3.4. It depicts the adjusted mean of PHQ-9 score for each level of cannabis use frequency by average age.

Source: TTM data, Waves 1–3, adult cohort, balanced sample

Socio-demographic and psychosocial factors associated with past-year cocaine use among adult males

TTM data presented in Table 3.1 of this chapter and NDSHS data presented in Table S3.3 in the supplementary materials indicate that the prevalence of recent cocaine use increased significantly among adult Australian males over the last decade.

In this section, some demographic and psychosocial factors associated with cocaine use over the first three waves of TTM data collection (2013/14 to 2020/21) among the study sample are identified.

The findings presented in Table 3.5 indicate that, overall, older age was associated with reduced odds of using cocaine (aOR = 0.93; 95% CI [0.91, 0.94]); specifically, on average, for each additional year of age, the odds of using cocaine decreased by 7%.

Further findings in Table 3.5 point to numerous characteristics associated with past-year cocaine use among the TTM sample. Higher income brackets were associated with cocaine use. Specifically, relative to a weekly household income of $959 per week or less (<$49,999/year), men who resided in households with a total weekly income of $2,880–$3,839 or >$3,840 had almost double (aOR = 1.93; 95% CI [1.26, 2.96]) and triple (aOR = 3.06; 95% CI [1.98, 4.72]) the odds of engaging in past-year cocaine use. Men who identified as non-heterosexual (i.e. homosexual or bisexual; aOR = 1.91; 95% CI [1.11, 3.28]) and men with greater conformity to masculine norms (aOR = 2.44; 95% CI [1.85, 3.22]) also had significantly greater odds of using cocaine in the past year.

Alcohol use was associated with cocaine use. Men who had drunk alcohol in the past year had over five times greater odds of having also consumed cocaine in the past year compared to those who had not drunk alcohol in the past year.

Factors associated with reduced odds of having recently used cocaine included being born outside of Australia (aOR = 0.69; 95% CI [0.48, 0.99]) and having a culturally and linguistically diverse background (aOR = 0.20; 95% CI [0.09, 0.43]). Residing in non-metropolitan areas of Australia was associated with around 75%–80% lower odds of recent cocaine use compared to living in a major city. Men in married or de facto relationships had about half the odds of men who had never married of recently engaging in cocaine use.

Table 3.5: Multilevel mixed-effects logistic regression model: Key socio-demographic and psychosocial factors associated with past-year cocaine use among adult Australian males, 2013/14–2020/21 (*N* = 9,895)

Variables	aOR	95% CI
Age (continuous)	0.93***	0.91, 0.94
Pre-tax household income (ref. = <$959 p/w or <$49,999 or less p/a)		
$960–$1,919	1.21	0.84, 1.73
$1,920–$2,879	1.46	1.00, 2.15
$2,880–$3,839	1.93**	1.26, 2.96
$3,840+	3.06***	1.98, 4.72
Aboriginal and Torres Strait Islander (yes)	2.17	1.00, 4.71
Non-Australian born	0.69*	0.48, 0.99
Culturally and linguistically diverse	0.20***	0.09, 0.43
Residential location (ref. = metropolitan)[a]		
Inner regional	0.35***	0.26, 0.49
Outer regional	0.22***	0.15, 0.33
Non-heterosexual	1.91*	1.11, 3.28
Highest level of education (ref. = Year 12 or less)[a]		
Certificate/diploma	1.18	0.90, 1.55
University degree	0.82	0.60, 1.13
Personal wellbeing = middle-high (ref. = low)	0.69**	0.54, 0.89
Employment status (ref. = Unemployed)		
Employed/working for profit or pay	1.51	0.95, 2.41
Out of labour force	0.90	0.45, 1.79
Conformity to masculine norms (low-medium vs high)[b]	2.44***	1.85, 3.22
Relationship status (ref. = never married)		
Widowed, divorced or separated	0.80	0.48, 1.33
Married or de facto	0.49***	0.37, 0.64
Past-year alcohol use	5.35***	2.86, 10.02
Individual-level variance (random parameter)[c]	7.21	5.98, 8.70
Intercept	0.02	0.01, 0.05***
Number of observations	22,885	

Notes: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; [a] Remote/very remote and 'other' education excluded (n = 197 total); [b] Measured using the 22-item CMNI (Mahalik et al., 2003); [c] To account for the inter-correlation and clustering of repeated measures for individual participants, a random intercept for individuals using participants' unique identifier was included in the model. aOR = adjusted Odds Ratio; CI = Confidence Interval; p/a = per annum; p/w = per week. Prior to this final model, a bivariate model (not shown here) showed an unadjusted association between age (a proxy for time) and use of cocaine in the past year (OR = 0.92; 95% CI: 0.91, 0.93).

Source: TTM data, Waves 1–3, adult cohort

Summary

The research presented in this Insights chapter is substantially unique in that it comprises analyses using data from a large, prospective cohort of adult Australian males that was representative of men aged 18–55 at the time of recruitment in 2013/14. There has been a paucity of such research examining illicit drug use among Australian men with an established, longitudinal, community-based sample of this scope; the data presented in this chapter therefore address a considerable gap in the Australian substance-use literature. Findings supplement existing data sources, including the NDSHS (AIHW, 2020), in providing a more comprehensive picture of drug use among men across the country over 2013/14–2020/21.

Reflecting trends seen in other recent studies focused on the general population (AIHW, 2020) and certain subgroups of people who use drugs (e.g. people who use ecstasy and related drugs; Sutherland et al., 2021), TTM data indicated that past-year use of cocaine increased significantly among adult males in Australia during this time period.

Corresponding with this change, law enforcement data have pointed to an increase in the weight of cocaine detections at the Australian border, in addition to record numbers of cocaine seizures and arrests nationwide in 2019/20 (ACIC, 2021). Importantly, a growth in cocaine use among Australia's general community has also resulted in a greater incidence of associated harms. For example, cocaine-related hospitalisations increased from 5.1 to 15.6 per 100,000 people between 2011/12 and 2017/18, and treatment episodes increased from 3.2 to 5.9 per 100,000 people between 2016/17 and 2017/18 (Man et al., 2021). In consideration of this, especially in the context of limited effective and available treatment options for people who use cocaine, Australian researchers have called for the evaluation of relatively uncommon treatment modalities (e.g. contingency management) in clinical settings (Farrell et al., 2019). Furthermore, these data collectively highlight a persistent need for promoting appropriate harm reduction options (e.g. reducing amount of drug used, identifying signs of psychosis) to reduce risks associated with heavy use and acute intoxication, in particular (Man et al., 2021).

One component of addressing cocaine use and related harms is identifying people who use the drug. Our findings indicated that factors associated with past-year cocaine use among Australian men included younger age, residing in households with greater combined incomes, living in major cities rather than inner or outer regional areas of the country, identifying as non-heterosexual, being single/never married, and past-year alcohol consumption. Such information could be beneficial to service providers seeking to identify Australian males who use cocaine, in addition to informing targeted education, referral and harm reduction initiatives.

Additional analyses presented in this chapter demonstrated that cannabis is the most commonly used illicit drug among Australian males. They also showed that more frequent (weekly or more) cannabis use was independently associated with experience of greater depressive symptoms among adult Australian males. This is consistent with some previous research; for example, a systematic review and meta-analysis by Lev-Ran and colleagues (2013) estimated that the odds of developing depression for people who used cannabis 'heavily' was higher than that for both people who engaged in 'light' cannabis use and those who did not use cannabis at all.

In addition to such mental health sequelae, research has associated regular/frequent cannabis use, early initiation and prolonged use with other adverse outcomes, including an increased likelihood of motor vehicle accidents and the development of dependence and cannabis use disorder (Feingold, Hoch, Weinstein, & Hall, 2021; Lopez-Pelayo et al., 2021). As jurisdictions worldwide move towards legalising both medicinal and recreational cannabis (UNODC, 2021), it is crucial that people who use cannabis, health professionals and service providers are aware of the possible adverse outcomes – mental health and other – of using cannabis, especially in relation to heavy or chronic use patterns and prolonged use over time. Intervening before people evolve to heavier (chronic, more frequent) patterns of use could be crucial to preventing associated harms.

It is important to note that although use of cannabis may lead to the onset or exacerbation of depressive symptoms, as indicated by findings presented in this chapter in addition to those of previous research

(Asselin et al., 2022; Brodbeck et al., 2007; Feingold & Weinstein, 2021; Kosiba et al., 2019; Wallis et al., 2022), some men will use cannabis (and other drugs) to self-treat or medicate depression and other mental health disorders. The different temporal aspects of primary exposure (past-year cannabis use) vs outcome (depression/PHQ-9 score over the past two weeks) provides evidence that the former does lead to the latter. Regardless, clinical research is needed to better understand the potential therapeutic benefits of cannabis for treating depressive symptoms. Qualitative research could also provide insight into current contexts in which Australian men effectively use illicit cannabis and other substances to address symptoms of depression and other mental health disorders.

Future waves of TTM will afford further opportunities to examine longer-term patterns and outcomes of cannabis and other drug use, including maintenance of harmful use patterns and transitions to abstinence. Linkage with Medicare datasets will enable investigation of service utilisation patterns among different subgroups of people who use drugs.

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TEN to MEN

The Australian Longitudinal Study on Male Health

Chapter 4

Recent natural disasters in Australia: Exploring the association with men's mental health and access to health care

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Key messages

- One in four Australian men were affected by a natural disaster between July 2019 and February 2021.

- Bushfires were the most prevalent disaster, followed by severe storms.
- Compared to those not affected by a natural disaster, men affected by bushfires were 1.3 times more likely to report moderate or severe depressive symptoms.

- Likewise, men affected by cyclones were 1.6 times more likely to report mild anxiety symptoms and those affected by storms were 1.5 times more likely to report moderate or severe anxiety symptoms.
- Disaster-affected men indicated a higher need for mental health care and significantly more barriers to accessing such health care than those unaffected by disaster.
- Mental health consultations were significantly higher among disaster affected men, with just over 15% of men affected by one natural disaster, and 17% of men affected by two or more natural disasters reporting they had consulted counsellor, psychologist and/or psychiatrist in the previous 12 months.
- Work commitments, a lack of services, cost, long wait times and practices not taking new patients were common reasons why disaster-affected men were unable to access mental health care.

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Overview

Natural disasters occur when severe and extreme weather or climate events overwhelm a community's capacity to cope and respond (Chaudhary & Piracha, 2021). They result in widespread financial, social and health impacts that can be devastating for affected Australian families and their communities (Lindenmayer & Taylor, 2020). Previous prevalence estimates have suggested that around 8% of Australians will be affected by a natural disaster in their lifetime, with men more likely to be affected than women (Mills et al., 2011). More up-to-date Australian estimates are needed, especially in consideration of increasing disaster incidence in Australia and the value of recent estimates in disaster planning efforts (Cai et al., 2015; Lindenmayer & Taylor, 2020).

In this chapter, Australian men's experiences of natural disasters between July 2019 and February 2021 are investigated, with a specific focus on the mental health of disaster-affected men and their use of health care services. The focus is on large-scale natural disasters that occur rapidly, including bushfires, floods, storms and cyclones, as well as disasters that endure over a longer period, such as persistent drought.

Natural disasters pose a significant threat to the wellbeing of affected individuals and can adversely impact mental health. Indeed, research has found that experiencing a natural disaster is associated with both short- and long-term psychological distress that can result in, or exacerbate, psychological disorders such as major depression and generalised anxiety (Fergusson, Horwood, Boden, & Mulder, 2014; Goldman & Galea, 2014; North & Pfefferbaum, 2013; Saeed & Gargano, 2022). For example, in the wake of extensive flooding in northern New South Wales in 2017, researchers found that, compared to the general population, mental ill-health was greater among those who had been directly impacted by the flooding or who had recently been affected by multiple natural disasters (Matthews et al., 2019).

Within the existing research on the experience and health and wellbeing outcomes of natural disasters, the focus is often on women and children as vulnerable populations (Reifels et al., 2015). As a result, less is known about men's experience of natural disasters, including the link between disaster exposure and mental health outcomes among men, including depression and anxiety. *Ten to Men* (TTM) provides an opportunity to address this gap.

Further insight into the extent to which disaster-affected men access and use mental health services, and possible reasons why they may not be able to, can also be gained from TTM. The recent Royal Commission Report into National Natural Disaster Arrangements (2020) noted that there was scope to improve mental health provision following natural disasters.

Existing research into men's use of mental health services, not specific to disasters, identifies stoicism, stigma, self-reliance, distrust of health professionals and uncertainty around the effectiveness of treatment as potential barriers or deterrents (Hull, Fennell, Vallury, Jones, & Dollman, 2017; Seidler et al., 2021). Different, and unique, barriers may arise among men affected by disaster; for example, where homes, infrastructure and/or social connections are damaged or disrupted. Damage sustained to the premises of local providers and/or transport networks may limit access to services; evacuation can lead to dislocation between men and care providers; or increased demand due to trauma-related conditions could limit available resources and result in long wait times for an appointment (Saeed & Gargano, 2022).

Research objectives

This chapter used data from Wave 3 of *Ten to Men* (TTM) to:

1. describe the recent (past year) prevalence of exposure to certain natural disasters – bushfires, drought, floods, severe storms and cyclones – among Australian men
2. examine the risk of experiencing mental ill-health associated with recent exposure to natural disasters
3. determine the extent to which men affected by natural disaster access mental health services
4. identify common barriers to use of mental health services among men affected by natural disaster.

The data used in this chapter were collected between July 2020 and February 2021. As such, participant's responses may reflect any disasters that occurred between July 2019 to February 2021 (see Box 4.1).

Box 4.1: Natural disasters in Australia over 2019–21

The summer of 2019 to early 2021 is regarded as one of the most devastating periods in Australia's recent environmental history. According to Royal Commission Report into National Natural Disaster Arrangements (2020), during this time:

- Many Australians were affected by the 'Black Summer' (2019/20) bushfires that burned through an estimated 24–34 million hectares across multiple states and territories. These fires destroyed around 3,000 homes and resulted in 33 fire-related deaths and an estimated 3,000 hospital admissions from smoke inhalation/poor air conditions.
- Bushfires were exacerbated by persistent periods of drought; for example, the summer of 2019–20 was the driest and hottest on record.
- Some states felt the effects of ex-tropical cyclone Esther. Associated above average rainfall resulted in major flooding in parts of Western Australia, Queensland and Victoria.
- Australians were also subjected to many storms and other flood events with above average rainfall over eastern and northern Australia.

Methods

This section describes the key measures and data analysis techniques used to address the above objectives. Information regarding the overall methodology of the TTM study is detailed elsewhere (e.g. Bandara, Howell, Silbert, & Daraganova, 2021; Swami et al., 2022).

Measures

Experience of natural disasters

Items relating to natural disasters were included in the Wave 3 survey of TTM (2020/21). Respondents were asked about their experience of natural disasters in the 12 months prior to their survey date with a series of questions asking, 'Have you been affected by any of the following natural disasters in the past year?' Response options included 'yes' or 'no' to each of:

- Bushfire
- Floods
- Severe storms
- Cyclone
- Drought
- Other
- None.

A total of 349 men (Total sample size, *N* = 7,919) did not respond to the natural disaster questions and were excluded from the analysis. These men did not differ on any key socio-demographic variables compared to the rest of the sample.

What does it mean to be affected by a natural disaster?

In the TTM survey, a specific definition of *affected by* was not provided to the respondents. As a result, responses to the natural disaster questions could subjectively reflect a broad range of disaster-related experiences, such as emotional distress, significant financial hardship and serious injury, illness and/or loss of life among friends or family.

Adverse disaster outcomes

For each disaster with a 'yes' response, TTM participants were asked to indicate which of the following adverse outcomes or experiences, if any, had occurred (multiple responses were permitted):

- Their home or property (including pets or livestock) was damaged or destroyed.
- Their home or property was threatened but not damaged or destroyed.
- They were advised by emergency services to evacuate from the area in which they live or were staying.
- Their travel or holiday itself or travel and holiday plans were affected.
- Their mental and/or physical health was affected.
- None of the above.

Current depression and anxiety symptoms

Current depression was measured using the Patient Health Questionnaire (PHQ)-9. The PHQ-9 assesses experience and severity of depressive symptoms over the past two weeks (Kroenke, Spitzer, & Williams, 2001). For each respondent, a total PHQ-9 score is calculated by summing individuals' responses to the nine questions, resulting in a total score ranging from 0 to 21. Depression was categorised as (1) no or minimal depression (score between 0 and 4), (2) mild depression (score between 5 and 9), and (3) moderate or severe depression (score of 10 or greater).

Similarly, the Generalized Anxiety Disorder (GAD)-7 tool was used to classify current experience and severity of generalised anxiety symptoms. This was also measured over the past two weeks (Spitzer,

Kroenke, Williams, & Löwe, 2006). A three-category variable was derived from GAD-7 scores (total scores could range from 0 to 21) to indicate (1) no or minimal anxiety (score between 0 and 4), (2) mild anxiety (score between 5 and 9) and (3) moderate or severe anxiety (score of 10 or greater).

Mental health care use and barriers to access

Men's use of mental health care was indicated by a variable derived from three questions asking men if they had consulted an accredited counsellor, psychiatrist or psychologist ('yes' or 'no') in the past year (excluding any time spent in hospital). A score of '1' indicated yes to any of counsellor, psychiatrist, psychologist, and '0' otherwise.

It was not possible to tell from the data whether mental health care had been received before or after the natural disaster/s in question or as a direct result of disaster experience. For more information on Australian men's mental health care usage see chapter 2 of this report.

To understand barriers to health care, respondents were asked whether they had been unable to access health services in the past 12 months for any of the reasons listed below (multiple responses were permitted).

Reasons related to the individual:

- Personal or family responsibilities/too busy
- Language barriers
- Work commitments
- Decided not to seek care/didn't bother
- Transportation problems.

Reasons related to service availability and accessibility:

- No service available in area at time needed
- Waiting time too long/no appointments
- Not taking new patients
- Cost.

Analysis

The first stage of the analysis calculated the prevalence of men affected by natural disasters and how the prevalence of each disaster varied across different residential localities (state/territory and metropolitan vs regional areas). Further descriptive analyses demonstrated the extent to which men had experienced adverse disaster outcomes, such as property damage or threats of damage, evacuation advice, disruption to travel and holidays, and impact on health. Survey weights that account for possible sampling bias and attrition have been applied throughout, unless otherwise specified.

A series of multinomial regression models were then generated to evaluate associations between being affected by natural disaster/s and experience of anxiety and/or depression. Each model was adjusted for age, culturally and linguistically diverse (CALD) background, Aboriginal and Torres Strait Islander identity, employment status, education level, marital status, Socio-Economic Indexes for Areas (SEIFA), Australian Statistical Geography Standard (ASGS) region of residence and state or territory of residence.

Five models were fitted for depression – one for each of bushfire, drought, flood, storm and cyclone, using the three-category depression variable (PHQ-9; 0 = No/minimal depression, 1 = Mild depression, 2 = Moderate/severe depression) as an outcome. Results showed whether being affected by each disaster was associated with the likelihood of experiencing depression; from that, we were able to quantify any increase in risk.

A second set of five models repeated this analysis using the three-category anxiety outcome measure (GAD-7; 0 = No/minimal anxiety, 1 = Mild anxiety, 2 = Moderate/severe anxiety).

Use of mental health care and barriers to use were investigated for men affected by each of bushfire, drought, flood, storm and cyclone. We tested for an association between being affected by any disaster and use of mental health services, and then examined usage and barriers to use by disaster type. Again, it was not possible to tell from the data whether mental health care had been received before or after the natural disaster/s in question, or as a direct result of a disaster experience.

Findings

Prevalence of recent experience of natural disasters

TTM findings from Wave 3 – displayed in Table 4.1 – show the widespread impact of natural disasters affecting Australian men; around one in four adult males were affected by at least one natural disaster type between July 2019 and February 2021. In consideration of the events of 'Black Summer', bushfires were the disaster that affected the most men (13%). Experience of storms was also relatively common, affecting around one in 10 men. Fewer men were affected by drought (7%) and flood (5%) during the study period.

Study findings also suggest that a small minority of Australian men had been further affected by multiple natural disasters in the past year. An estimated 9% of men were affected by two or more disasters, most commonly bushfire and either drought (2%) or storms (2%). One per cent had been affected by all of bushfires, drought, storms and flood in the past year.

Table 4.1: Percentage of Australian males aged 16–63 years affected by natural disaster, 2020/21

Natural disaster	%	95% CI	*N*
Bushfire	13.4	[12.1, 14.9]	1,083
Drought	6.6	[5.8, 7.6]	648
Flood	5.4	[4.6, 6.3]	382
Storm	10.6	[9.4, 12.0]	735
Cyclone	1.4	[1.0, 1.9]	127
Other	0.3	[0.2, 0.5]	29
Any	24.1	[22.4, 25.9]	1,968

Notes: Total *N* = 7,570 participants, equating to 6,260,800 Australian males aged 16–63. Two hundred and eighty respondents specified COVID-19 as a natural disaster, under the 'Other' category. They have been excluded from analyses, as the focus of this chapter is on naturally occurring events that are principally a result of weather and climate. Further, due to less the 1% of responses on the 'Other' category, other is not included in all subsequent analyses.

Source: TTM data, Wave 3, weighted

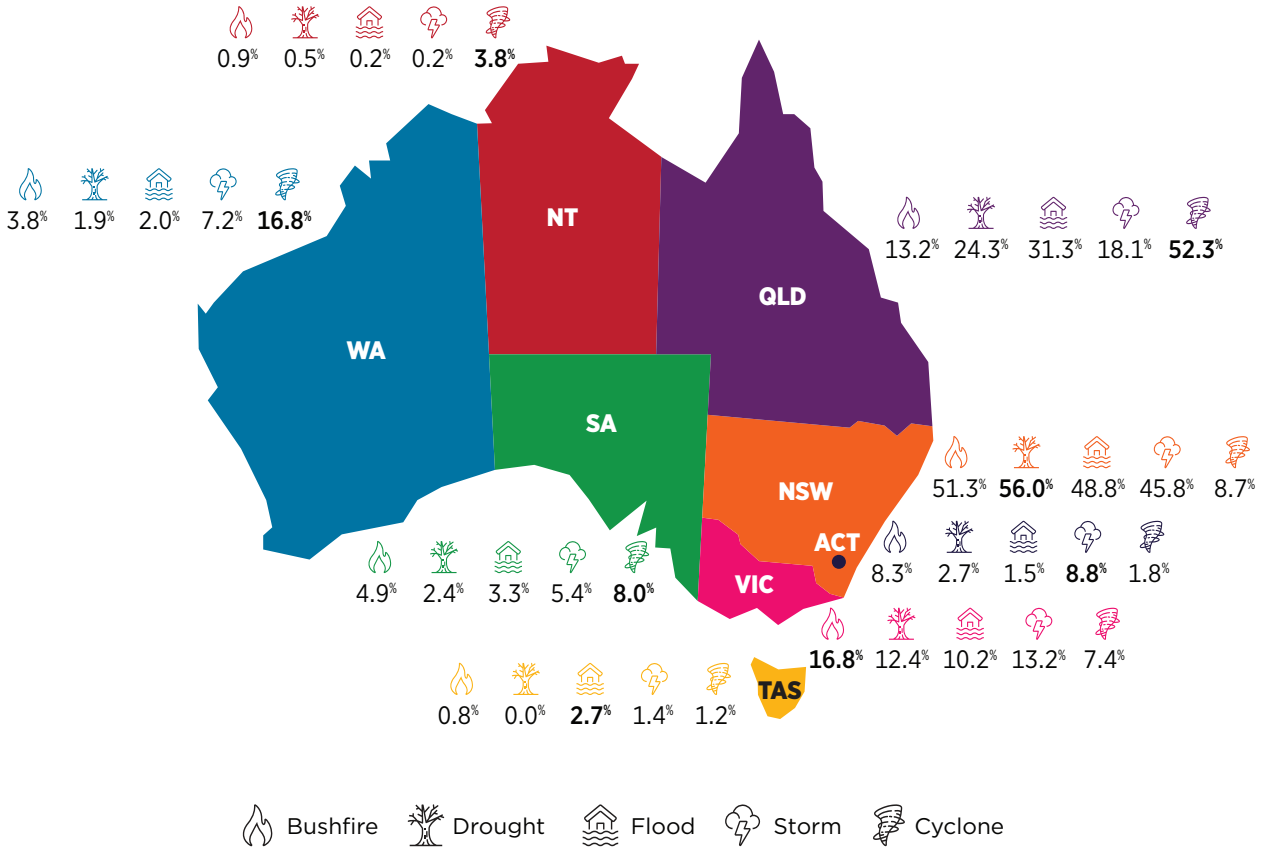
How did prevalence of natural disasters vary according to residential location?

State and territory

The prevalence of men affected by natural disasters varied considerably across Australian states and territories. Figure 4.1 shows the state or territory of residence for men affected by each type of disaster. New South Wales was the most common state of residence for men affected by bushfire (51%), drought (56%), storms (46%) and floods (49%). Over half of those affected by cyclones lived in Queensland (52%).

Across all disaster types, men residing in the Northern Territory and Tasmania reported the lowest rates of disaster experience (ranging from 0% to 4%).

Figure 4.1: Recent experience of disasters across state/territory of residence among Australian men aged 18 – 63 years, 2020/21



Note: Bolded value shows the highest proportion for each of the disasters for each state/territory.
Source: TTM data, Wave 3, weighted

Metropolitan vs regional and remote areas

For most types of disaster, the proportion of men affected varied across metropolitan (i.e. major city) and non-metropolitan (i.e. regional and remote) areas. Men affected by bushfire predominantly resided in metropolitan areas (62%, 95% CI [56.4, 66.5]) as did those affected by flood (60%, 95% CI [52.2, 66.9]) and storm (76%, 95% CI [71.2, 80.2]). However, drought-affected men tended to reside in non-metropolitan regions (60%, 95% CI [53.0, 66.2]), while those affected by cyclone were equally likely to be from metropolitan (49%, 95% CI [36.0, 63.2]) as from non-metropolitan areas (50%, 95% CI [36.8, 64.0]). It is important to note that how exactly participants were 'affected' was not explored in the TTM survey; for example, men residing in major cities could have been affected by bushfires due to pervasive smoke, whereas those in regional or rural communities may have been directly exposed to the fire.

Adverse outcomes of natural disasters

Those affected by a natural disaster can experience a range of negative or distressing outcomes. TTM data showed that bushfires, storms, floods and cyclones varied in the degree to which they impacted homes, required evacuation and changed travel plans. However, as these outcomes are not common for men experiencing drought, this information is not included in the report. Further, each disaster had a different perceived impacted on mental and physical health.

As shown in Table 4.2, of adult Australian males recently affected by natural disasters in 2020/21, three out of 10 had their homes threatened as a result. Cyclones presented the greatest threat to the homes of men recently affected by a natural disaster; nearly half of those who had recently experienced a cyclone had their home threatened. Comparatively, the homes of 39% of men who recently experienced floods had been threatened. Storms and bushfires presented a lower level of threat, each affecting 35% of disaster-affected men.

In terms of home damage, 46% of men who had recently been affected by a storm, 22% of men who had recently been affected by floods and 19% of those recently affected by cyclones had their home damaged as a result. Significantly fewer men had their homes damaged by bushfires (5%).

Public health officials typically advise people who reside in areas at-risk of direct disaster-related harm to evacuate to protect the physical health and safety of individuals and their families. As displayed in Table 4.2, being advised to evacuate was most prevalent among men affected by bushfires (25%). Fewer men affected by floods or cyclones were advised to evacuate (14% and 12%, respectively). Evacuation orders were relatively rare among those affected by storms (2%).

Extreme weather events can also impact travel or holiday plans. TTM findings indicated that adverse travel/holiday outcomes were most common among men affected by bushfires and cyclones (Table 4.2). Only a small proportion of storm-affected men reported that their travel had been affected as a result. While exactly how respondents' travel and holiday plans were affected was not the focus of this report, these findings may reflect delayed or cancelled transportation options due to concerns over operational safety or an active disaster taking place in the travel destination, rendering the area too dangerous to visit.

Table 4.2: Adverse outcomes of recent natural disasters experienced by Australian males (aged 16–63 years), 2020/21

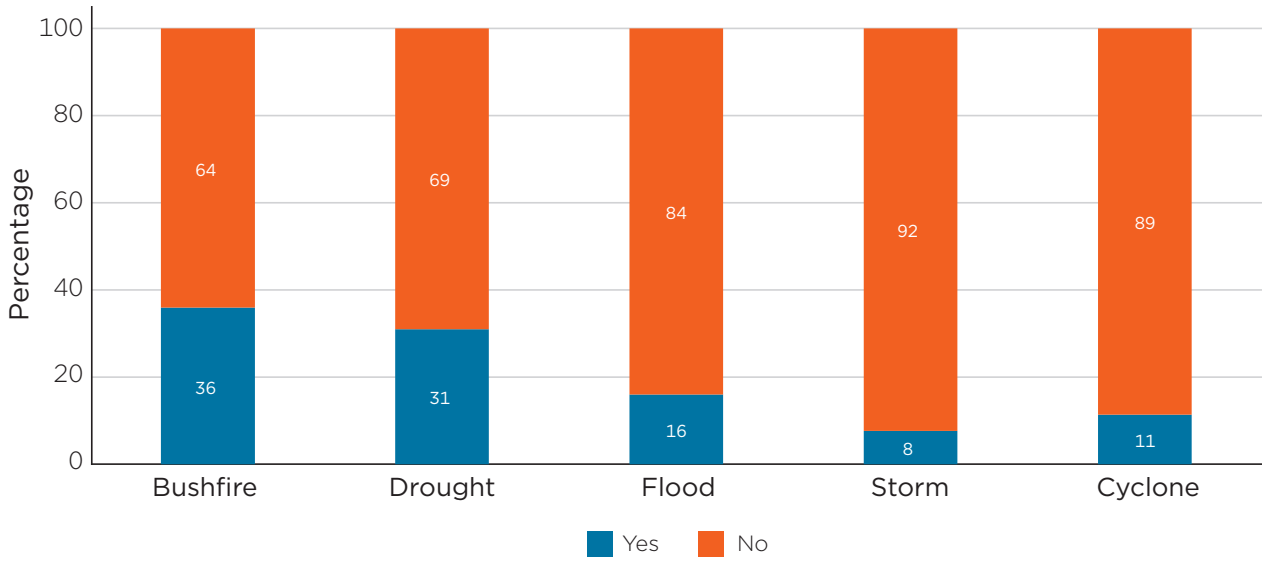
	Bushfire *N* = 1,110		Flood *N* = 400		Storm *N* = 753		Cyclone *N* = 126	
	% Yes	95% CI	% Yes	95% CI	% Yes	95% CI	% Yes	95% CI
Home threatened	34.6	[30.3, 39.1]	39.3	[31.2, 48.0]	34.6	[27.9, 41.9]	47.2	[33.1, 61.7]
Home damaged	5.0	[3.2, 7.8]	21.5	[15.4, 29.3]	46.1	[38.2, 54.2]	18.6	[10.2, 31.4]
Advised to evacuate	25.1	[21.2, 29.5]	13.8	[8.7, 21.3]	2.1	[0.8, 5.8]	11.7	[5.4, 23.4]
Travel plans affected	39.8	[35.1, 44.7]	20.9	[14.8, 28.7]	5.8	[3.6, 9.1]	30.5	[16.9, 48.8]
Any	11.2	[10.0, 12.5]	4.2	[3.5, 5.1]	8.4	[7.3, 9.7]	1.1	[0.8, 1.6]

Notes: The disaster experience questions included in the survey did not fully capture the intricacies of men's experience of drought. Therefore, drought was not included in this analysis. Target population ranges from 86,058 to 829,767.

Source: TTM data, Wave 3, weighted

Men's perceptions about whether a disaster affected their mental and/or physical health were also examined (Figure 4.2). Bushfires and drought were perceived as having the greatest impact on mental and physical health; around three in 10 men who had recently experienced bushfire (36%, 95% CI [32, 40.6]) or drought (31%, 95% CI [25.5, 37.1]) perceived that their mental and/or physical health was affected. A smaller proportion of men affected by floods (16%, 95% CI [11.4, 22.1]) and cyclones (11%, 95% CI [5.6, 21.7]) had their mental or physical health affected. Lastly, only a few men perceived that their mental or physical health had been affected by storms (8%, 95% CI [4.5, 12.8]).

Figure 4.2: Perception of mental or physical health impacts among adult Australian males (16–63 years) affected by natural disasters, 2020/21



Notes: Population estimates vary depending on disaster: bushfires (*N* = 826,974), drought (*N* = 409,785), flood (*N* = 335,269), storm (*N* = 658,896) and cyclone (*N* = 86,058).

Source: TTM data, Wave 3, weighted

Multivariable analysis: Natural disasters and mental health

This section presents the findings of two multinomial regression models that tested associations between being affected by a natural disaster and mental ill-health outcomes – specifically, any instance of mild, moderate or severe symptoms of anxiety or depression (Table 4.3).[1] These analyses used data indicating experience of natural disasters between July 2019 and February 2021 among Australian men aged 18–63 years.

Overall, results suggested that, when controlling for whether men had been affected by other disasters (see 'affected by other disaster' variable in Table 4.3), those recently affected by bushfires, cyclones and storms had an increased likelihood of ill-mental health compared to those not affected by such natural disasters (see Table 4.3). No evidence was found in this sample of a relationship between being affected by either drought or flood and ill-mental health.

Notably, only recent experience of bushfires was independently associated with depression after controlling for the recent experience of any other natural disaster. Compared to men not recently affected by natural disasters, those who had recently been affected by bushfires were 1.2 times more likely (95% CI [1.0, 1.5]) to report mild depression, and 1.3 times more likely (95%CI [1.0,1.6) to report moderate or severe depression, relative to no/minimal depression. In addition to being affected by a bushfire, there was a small increase in the likelihood of moderate or severe depression when men were also affected by any other disaster. In such cases, men were 1.7 times more likely to report moderate or severe depression, compared to those unaffected by disaster.

Cyclones and storms were significantly associated with anxiety. Compared to men who were not recently affected by a cyclone, those affected were 1.6 times more likely (95% CI [1.0, 2.5]) to report mild anxiety, relative to no/minimal anxiety. Men affected by any other disaster in addition to a cyclone were twice as likely to have mild anxiety on average, compared to those unaffected by any disaster.

Men affected by storms were 1.5 times more likely (95% CI [1.1, 2.0]) to report moderate/severe levels of anxiety (relative to no/minimal anxiety) than those unaffected. Being affected by any other disaster as well as storms increased the risk of having moderate/severe anxiety; specifically, men were twice as likely to have moderate/severe levels of anxiety compared to those unaffected by disaster.

1 Note that the full multivariable models are provided in Tables S4.1 and S4.2 of this report's Supplementary materials.

Table 4.3: Parameter estimates from a series of multinominal logistic regressions examining the relationship between natural disasters and mental health (as indicated by experience of at least mild depression and anxiety, compared to no/minimal levels of indicator)

	Disaster type									
	Bushfire[a]		Drought[a]		Flood[b]		Storm[b]		Cyclone	
	aOR	95% CI	aOR	95% CI	aOR	95% CI	aOR	95 CI%	aOR	95% CI
Depression models – Reference: No/Minimal depression										
Mild depression										
Affected by given disaster	1.22*	[1.02, 1.46]	1.15	[0.91, 1.44]	1.05	[0.79, 1.39]	1.18	[0.96, 1.45]	1.35	[0.85, 2.12]
Affected by any other disaster	1.08	[0.91, 1.28]	1.19*	[1.02, 1.38]	1.20*	[1.04, 1.40]	1.13	[0.96, 1.32]	1.20*	[1.03, 1.38]
Moderate/severe depression										
Affected by given disaster	1.30*	[1.05, 1.63]	1.04	[0.79, 1.38]	1.02	[0.73, 1.42]	1.27	[0.99, 1.62]	1.04	[0.58, 1.85]
Affected by any other disaster	1.34*	[1.09, 1.64]	1.58***	[1.32, 1.90]	1.60***	[1.34, 1.92]	1.38**	[1.14, 1.68]	1.57***	[1.32, 1.87]
Anxiety models – Reference: No/Minimal anxiety										
Mild anxiety										
Affected by given disaster	1.05	[0.87, 1.27]	1.21	[0.96, 1.53]	1.25	[0.95, 1.66]	1.12	[0.90, 1.39]	1.58*	[1.02, 2.47]
Affected by any other disaster	1.33***	[1.12, 1.58]	1.20*	[1.03, 1.40]	1.25**	[1.07, 1.45]	1.27**	[1.08, 1.50]	1.27**	[1.09, 1.47]
Moderate/severe anxiety										
Affected by given disaster	1.28	[0.95, 1.64]	1.18	[0.87, 1.61]	0.95	[0.65, 1.40]	1.50**	[1.14, 1.96]	1.27	[0.68, 2.38]
Affected by any other disaster	1.39**	[1.11, 1.76]	1.52***	[1.24, 1.87]	1.66***	[1.35, 2.03]	1.40**	[1.12, 1.74]	1.56***	[1.27, 1.90]

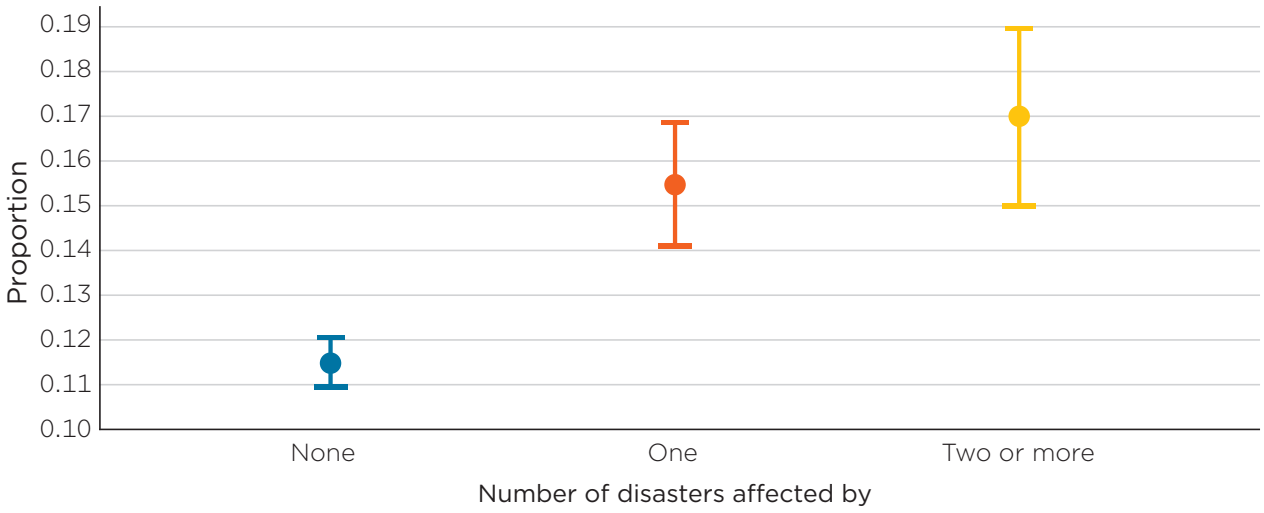
Notes: aOR = adjusted odds ratio; CI = confidence interval. Models adjusted for age; CALD status; Aboriginal and Torres Strait Islander identity; employment status; education level; marital status; area disadvantage (SEIFA); region of residence; state or territory of residence. As indicated in the table, all models control for other types of disasters (i.e. affected by other disaster). [a] Sample excludes NT, Tas.; [b] Sample excludes NT (see Supplementary materials). ***p = <.001, **p = <.01, *p = <.05.

Source: TTM data, Wave 3

Mental health care access and use

Natural disasters can take a toll on the mental health and wellbeing of individuals and families, and those affected may require treatment by a health professional. In this section, the use of mental health care services by men recently affected by a natural disaster is investigated. TTM findings indicated a significant association ($X_2^2 = 14.56, p < 0.1$) between having been affected by a natural disaster in the last 12 months and men's use of mental health care services in the same period. As shown in Figure 4.3, the proportion of men who had consulted a mental health professional was 4–5 percentage points higher among those who been recently been affected by at least one disaster compared to those who were unaffected. As noted in this chapter's 'Methods' section, it was not possible to determine whether services were accessed prior to, during or following the disaster in question.

Figure 4.3: Mental health care consultations among Australian males (16–63 years) recently affected by natural disasters, 2020/21



Notes: *N* = 14,959, proportion of men who consulted accredited counsellor, psychiatrist, psychologist in past year. Confidence intervals calculated at 95% level.

Source: TTM data, Wave 3, weighted

Table 4.4 shows the estimated percentages of Australian men affected by each type of disaster who also used mental health care in the past 12 months. Around 15%–16% of men affected by each of bushfires, drought, storms or cyclones in the past year had consulted a counsellor, psychologist and/or psychiatrist in the same period. Those affected by flood had a higher rate of consultation, with around one in five (21%) doing so.

Table 4.4: Consultations with mental health professional by type of disaster for Australian men (16–63 years) affected by natural disasters, 2020/21

Type of disaster – affected by	*N*	Number who consulted[a]	%
Bushfire	1,094	150	15.0
Drought	665	74	15.8
Flood	389	64	20.5
Storm	748	110	16.0
Cyclone	127	22	15.4
Any	1,945	280	16.4

Notes: [a] Consulted accredited counsellor, psychiatrist, psychologist in past year.

Source: TTM data, Wave 3, weighted

Barriers to health care access

Generally, TTM findings indicated that men affected by natural disasters reported more barriers to accessing mental health care than those who were unaffected (Table 4.5). Work commitments, a lack of services, prohibitive cost, a long wait time for appointments and practices not taking new patients were common reasons why disaster-affected men were unable to access health care. For each of bushfire, drought, flood and storm disaster, around one in three men affected (33%–34%) were unable to access health care due to work commitments, and approximately 27%–32% because of cost or long wait times/no appointments available. Among men affected by cyclones, one-quarter were unable to access health care due to a lack of services in the area, and just over one in five due to cost. For most reasons and disaster types listed in Table 4.5, the percentages given were statistically higher among those affected than among those not affected by any disaster (tested at the 5% level).

Table 4.5: Reasons for being unable to access health care among Australian males (16–63 years) affected by disaster, 2020/21

		Person-related (%)				Provider-related (%)			
Type of disaster	*N*	Language barriers	Work commitments	Transport problems	Too busy	No service in area	Cost	Wait time too long/no appointments	Not taking new patients
Bushfire	1,117	1.0	33.3*	3.0	18.1	18.9*	28.6*	28.5*	12.1*
Drought	676	1.7	32.8*	5.3	18.2	27.8*	33.4*	26.8*	15.4*
Flood	406	1.9	34.3*	3.5	17.6	25.8*	29.7*	31.8*	15.3*
Storm	762	1.6	33.7*	6.9*	21.8*	17.5*	31.2*	28.5*	11.7*
Cyclone	129	1.2	25.8	4.9	11.7	25.3*	22.4*	18.8	4.4
None	5,584	1.0	27.5	4.8	19.7	13.8	20.5	23.7	6.6

Notes: * denotes significantly higher proportion compared to men affected by no disaster, tested at 5% level. Men were also asked about COVID-related barriers to health care access, including not able to leave the house due to coronavirus restrictions and availability of services restricted due to the coronavirus pandemic. There is little evidence to suggest that COVID-related restrictions exacerbated men's difficulties in accessing health care, irrespective of the type of disaster experienced (see Supplementary materials).

Source: TTM data, Wave 3, weighted

Addendum: the 2022 flood events

At the time of writing, many towns and suburbs across eastern Australia have experienced widespread flooding. The recent flood event is not an isolated incident, with much of Queensland and northern New South Wales inundated by flooding earlier in 2022. In line with recommendations from the recent royal commission into Australia's natural disaster arrangements (e.g. Recommendation 15.4: *Enhance health and mental health datasets*), our findings can be applied to current events to provide a better understanding of the likely health impacts of disaster events such as these to inform essential health care planning and resource allocation.

Flooding poses a prominent risk to the homes or property of affected individuals

Floods have devastating effects on the lives of those affected, such as home or property damage, dislocation, and physical injury or loss of life to self or others. Our 2019/20 data demonstrated that 39% of flood-affected men reported that their home or property had been *threatened*. Additionally, one in five flood affected men reported that their home or property had been *damaged*. Further, home damage caused by flooding was four times that of home damage due to bushfires. These findings provide insights into the ways in which flood events impact men's lives when compared with other natural disasters.

Sixteen per cent of flood-affected men indicated that their mental or physical health was affected

In the current TTM report, men affected by bushfires, storms and cyclones were at a significantly greater risk of experiencing ill-mental health compared to men not affected by such disasters. Although a significant association between floods and indicators of depression or anxiety was not observed in the current study, this does not suggest that flood events do not impact upon the health of Australian men. In fact, our data show around 16% of Australian men affected by floods in 2019/20 felt as though their mental or physical health had been impacted by their experience of floods. Previous research has suggested that individuals affected by flooding who report mild to moderate levels of distress in the short term can still be at risk for long-term detriments to their mental health. Furthermore, the existing literature demonstrates the strongest predictor of a person's mental health outcomes following natural disasters of all types is the degree of exposure to such events (Fernandez et al., 2015). Given the unprecedented scale of the 2022 flood events, it is likely that the 2022 flood events will have a significant effect on mental health outcomes. Future waves of TTM data will be crucial to examining the potential long-term impacts of flooding experienced in 2019/20, as well as the recent flood events.

Compared to other natural disasters, flood-affected men report the highest rate of mental health care consultations

Twenty-one per cent of flood-affected men saw a counsellor, psychologist or psychiatrist in the 12 months prior to data collection. This figure is 4% greater than the proportion of consultations for any other natural disaster, indicating a greater need for mental health care among men affected by floods. However, like all disaster-affected men, those affected by floods faced significant barriers to accessing health care including work commitments, no services in the area, cost, long wait times and clinics not taking new patients.

While temporary mental health care services are often rolled out during or immediately after a natural disaster, these findings point to a prominent need for funding and resources to address systemic barriers to health care faced by disaster-affected men. It is also important to note that this effect is not likely driven by men residing in regional or rural areas, as our report also demonstrated that 60% of flood-affected men live in major cities.

Health and infrastructure implications of these findings for the 2022 flood events

Based on TTM data and the anticipated scale of the 2022 flood events, the following observations can be applied to decisions around the resourcing required for the current and future flooding events:

- Significant impacts on mental health of flood-effected individuals are to be expected following the 2022 floods, including symptoms of anxiety and depression.
- Flood-affected individuals exhibit higher levels of health care needs following their exposure, including the use of counselling, psychology and psychiatry services.
- Barriers to health care access among men for the effective treatment of disaster-related mental health outcomes include work commitments, lack of services, prohibitive costs, extended wait times or practices not taking new patients.
- Emerging evidence suggests innovative care delivery models (e.g. community-led mental health services, enhanced access to telehealth, resilience-focused interventions) may supplement traditional health care, and improve outcomes for flood-affected Australians.
- Damage to homes and property associated with flood events is disproportionately large, when compared with other similarly sized natural disasters. Responses including community 'clean up' efforts and home and property restoration projects can buffer flood-related mental health impacts.
- Longitudinal studies, such as TTM, allow targeted identification of enabling and protective factors for mental ill-health following natural disasters.

Summary

Within Australia's recent environmental history, 2019–2021 is regarded as one of the most devastating periods of natural disaster incidence. Our data provide insight into men's exposure to natural disasters during this time, showing that around one in four Australian men were affected by at least one disaster, and approximately one in 10 men were affected by two or more disasters. These estimates are higher than those found in previous research, such as those by Mills and colleagues (2011) who found that 8% of Australians will be affected by a natural disaster in their lifetime. Our findings reflect the increasing incidence of natural disasters in Australia (Lindenmayer & Taylor, 2020).

In this chapter, five types of disaster were investigated – bushfire, drought, flood, storm and cyclone. Overall, bushfires were the most prevalent disaster affecting Australian men, closely followed by storms. Drought and floods were similarly prevalent, each affecting around 6% of men, whereas cyclones only affected a small minority of men. These findings are consistent with the natural disaster incidence observed across Australia during 2019–2021, where devastating bushfires coincided with, or were followed by, other unprecedented weather events such as drought, severe storms and flooding (Royal Commission into National Natural Disaster Arrangements, 2020).

Disaster-affected men experience a variety of adverse outcomes

Natural disasters can cause considerable damage and disruption to the lives of individuals and families. Our data showed that men affected by a natural disaster can experience a range of adverse outcomes, such as having their homes threatened or damaged, disruption of travel or holiday plans and being advised to evacuate. Importantly, the prevalence of these outcomes varied between each disaster. Bushfires were the most damaging and disruptive disaster, with just over one in 10 men reporting an associated adverse outcome. Comparatively, storms resulted in adverse outcomes for around 8% of affected men, whereas floods and cyclones resulted in adverse outcomes for less than 5% of those affected.

Of the adverse bushfire-related outcomes examined, disruptions to travel or holiday plans were the most prevalent, experienced by around 40% of bushfire-affected men. This finding is reflective of the impact that the 'Black Summer' bushfires had on the Australian tourism industry. During this 2019–20 event, wildfire tore through many popular tourist destinations, destroying holiday spots and resulting in cancelled travel plans. The wide-reaching impacts of these fires on the industry were felt both during the summer and in the months following the disaster. According to the Australian Tourism Export Council (2020), the Black Summer fires resulted in a loss of $4.5 billion to the Australian economy. TTM data presented in this chapter provide further insight into how common bushfire-related travel disruptions were among Australian men.

Home or property damage was an additional adverse outcome experienced by disaster-affected men in 2019/20, particularly among those affected by severe storms; almost half of this group reported that their homes or property had been damaged or destroyed. This estimate is higher than that produced by other research from 2020 that found that around 30% of men surveyed had recently had their home damaged by a storm (Insurance Council of Australia, 2021). These findings highlight the impact that severe storms can have on the lives of Australian men.

While beyond the scope of the current chapter, it is important that further studies explore the relationship between storm-related home damage and mental health among men, particularly in consideration of previous research showing that disaster-related home damage is associated with higher levels of stress and coping difficulties (Sattler, Claramita, & Muskavage, 2018) and in the context of a burgeoning incidence of natural disasters in Australia generally (Lindenmayer & Taylor, 2020).

Bushfires, storms and cyclones are negatively associated with men's mental health

Our data shed light on the relationship between natural disasters and mental health among Australian men – a population that is often not well-considered in the existing research. Men's perceptions of the impact of certain disasters on their health were explored. The likelihood that being affected by a natural disaster is associated with depression or anxiety was also examined. Key insights attained from this work are detailed below.

Bushfires are associated with higher levels of depression

Among disaster-affected men, bushfires had the highest perceived impact on mental and physical health than any other disaster. This finding further points to the considerable toll that the 'Black Summer' bushfires had on men's health when compared to other natural disasters that occurred in 2019/20. Investigation of the relationship between bushfires and mental health revealed that recently being affected by a bushfire was significantly associated with depression; specifically, bushfire-affected men were 1.3 times more likely to report depressive symptoms than men not affected by bushfires.

Although these findings provide a useful snapshot of the relationship between bushfires and depression among Australian men, the data were captured at a single time point. Therefore, the current findings cannot be used to infer causality.

Future waves of the TTM study will provide opportunities to continue exploring the long-term health, wellbeing and social impacts of disaster events such as 'Black Summer' on men's health. This is an important future avenue as the mental health effects of natural disasters have been found to persist over time (Bryant et al., 2014). Knowledge of how bushfires can impact men's health will be crucial to informing how public health officials provide appropriate psychological support to Australian men following disaster events. Such information is particularly important given the increased risk of bushfire incidence and severity (Jalaludin & Morgan, 2021).

Storms and cyclones are associated with higher levels of anxiety

Although severe storms and cyclones affect the lives of many Australians each year, TTM data presented in this chapter show that very few men perceive these extreme weather events to impact their mental or physical health. However, the results of our multinominal logistic regression models suggest otherwise. Specifically, men affected by storms or cyclones were more likely to report higher levels of anxiety than those unaffected by such disasters.

It is unclear why a discrepancy was found between men's perceptions of the health impacts of storms and cyclones and the observed relationship between these events and anxiety. Limited research has investigated this area; however, the current results are consistent with research on hurricanes and mental health in the USA. Hurricanes are tropical storms that occur north of the equator. Characterised by high-speed winds and torrential rain that can cause massive destruction to homes and infrastructure, they are comparable to cyclones in the southern hemisphere. Research on people affected by Hurricane Sandy showed that 46% of those affected by this event reported moderate to severe symptoms of anxiety (Schwartz et al., 2015). Other evidence suggests that these symptoms can persist over time, particularly if individuals also experienced property damage (Schwartz, Gillezeau, Liu, Lieberman-Cribbin, & Taioli, 2017). TTM data showed that one in three men affected by storms experienced home damage. Future TTM work may be able to unpack the role of storm damage on mental health among Australian men.

Drought, floods and mental health

Inconsistent with a strong body of empirical work (Hanigan, Schirmer, & Niyonsenga, 2018; O'Brien, Berry, Coleman, & Hanigan, 2014; Reifels, Mills, Dückers, & O'Donnell, 2019), our data did not show that drought and floods were significantly associated with depression or anxiety. This is potentially due to methodological limitations of the study; specifically, understanding how these two disasters are linked to mental health may require more nuanced items (questions) than what is currently available in the TTM survey. For example, the relevant Wave 3 survey items asked men to report 'yes or no' as to whether their

home or property was damaged or destroyed because of a given disaster. They were not queried about the extent or quality of any damage, nor any financial consequences. Additionally, the item on travel and holidays was general in nature; more specific questions around abilities or capabilities to reach key local services during a natural disaster may improve understanding of how floods affect mental health.

Further, as drought is an enduring/longer-term natural disaster, the relationship between drought and mental health is best understood over a longer period than the single time point captured in the current analyses. Men's experiences of natural disasters were first measured in Wave 3 of TTM, and future waves of the survey will be integral to understanding the relationship between drought and mental health, especially given nearly one in three men affected by drought perceived that their mental or physical health was impacted by the experience.

Disaster-affected men indicate a higher need for mental health care but face access barriers

TTM findings presented in this chapter demonstrate the mental health care needs of disaster-affected men and highlight the need for the provision of mental health care services in disaster-affected regions. Results showed the proportion of men who had consulted a counsellor, psychologist or psychiatrist in the previous 12 months was 4–5 percentage points higher among those affected by disaster in that time than among those unaffected. There is a caveat, however, in that consultations may have taken place prior to the disaster occurring, and not as a direct response to it; it was not possible to determine temporal ordering from the data available. Regardless, around one-third of men who had recently been affected by each of drought and bushfire/s believed that the experience had adversely affected their mental and/or physical health, indicating that such events should be considered lasting public health concerns.

Previous studies have identified deterrents to men accessing mental and general health care outside of a natural disaster context including stigma, stoicism and self-reliance (Hull et al., 2017; Seidler et al., 2021). Likewise, research using TTM data from Waves 1 and 2 pointed to cost and availability of appointments as common barriers preventing some Australian men from accessing general health care (Swami et al., 2020). The present study found that work commitments, lack of services, cost, waiting too long for appointments and practices not taking new patients were frequently cited by disaster-affected men as reasons why they were unable to access health care. These barriers occurred at higher rates among disaster-affected men than those unaffected by disaster. Following the 2019/20 summer bushfires, for example, many affected individuals and families had limited access to health care services, or resided in areas that already had limited health care provisions further limiting their ability to engage with services (Cousins, 2020; Royal Commission into National Natural Disaster Arrangements, 2020).

Moving forward, disaster planning efforts need to consider and reduce barriers to health care to provide disaster-affected Australians with the care they need. Existing evidence suggests that reducing barriers to health care in disaster contexts can aid recovery for affected individuals. In a recent report by the Black Dog Institute (2020), it was recommended that service availability should be increased in disaster affected areas, with greater mental health care immediately after a disaster event and in the 12 months following such event. Innovative delivery models such as community-led mental health services, enhanced access to telehealth and greater access to resilience focused interventions are recommended to ensure better outcomes for disaster affected Australians.

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TEN to MEN

The Australian Longitudinal Study on Male Health

Appendix A

Supplementary material

Australian Government
Department of Health and Aged Care

Australian Government
Australian Institute of Family Studies

The *Ten to Men* (TTM) Insights report's Supplementary Material includes details regarding the statistical methods, key measures and findings included in the four empirical chapters.

Further information on the study design, questionnaires, statistical considerations, data files and other user resources is available via the TTM *Data User Guide* on the TTM website.[1]

1 tentomen.org.au

Overview of statistical methods and terms used in the report

Confidence interval

A confidence interval (CI) is a range of values, above and below a finding, in which the actual value is likely to fall. The CI represents the accuracy of an estimate, and it can take any number of probabilities, with the most common being 95% or 99%. Unless otherwise specified, the analysis in this report uses a 95% CI. This means that the CI covers the true value for 95 out of 100 of the outcomes.

In graphs, 95% confidence intervals are shown by the 'I' bars at the top of each column. Where confidence intervals for the groups being compared do not overlap, this indicates that the differences in values are statistically significant at the $p < 0.05$ level.

Mean

'Mean' is the statistical term used for what is more commonly known as the average – the sum of the values of a data series divided by the number of data points.

Standard deviation

'Standard deviation (SD)' is a statistical term used for variation or variability in a set of values. Lower standard deviations indicate that the values tend to be close to the mean, while higher standard deviations indicate that the values are spread out over a wider range.

Odds ratios

An odds ratio (OR) is a measure of association between an exposure and an outcome. The odds ratio represents the odds that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure.

ORs are used to compare the relative odds of the occurrence of the outcome of interest (e.g. disease or disorder), given exposure to the variable of interest (e.g. health characteristic, aspect of medical history). The OR can also be used to determine whether a particular exposure is a risk factor for a particular outcome, and to compare the magnitude of various risk factors for that outcome.

- OR = 1 Exposure does not affect odds of outcome.
- OR > 1 Exposure is associated with higher odds of outcome.
- OR < 1 Exposure is associated with lower odds of outcome.

Logistic regression models

Logistic regression models are used to estimate the effects of factors, such as age and educational attainment, on a categorical dependent variable, such as attendance at religious services. The standard models examine 'binary' dependent variables, which are variables with only two distinct values, and estimates obtained from these models are interpreted as the effects on the probability that the variable takes one of those values. For example, a model might be estimated on the probability that an individual regularly attends religious services (as opposed to not attending religious services).

Chi-square test

A chi-square (X^2) test is used to investigate whether distributions of categorical variables differ from one another. For example, are overweight or obese men more likely to smoke cigarettes than non overweight or obese men?

Statistical significance

In the context of statistical analysis of survey data, a finding is statistically significant if it is unlikely that the relationship between two or more variables is caused by chance. That is, a relationship can be considered to be statistically significant if we can reject the 'null hypothesis' that hypothesises that there is no relationship between measured variables. A common standard is to regard a difference between two estimates as statistically significant if the probability that they are different is at least 95%. However, 90% and 99% standards are also commonly used. Unless otherwise specified, the 95% standard is adopted for regression results presented in this report. Note that a statistically significant difference does not mean the difference is necessarily large, it simply means that you can be fairly confident there is a difference.

Sample weights

Sample weights (for study participants) were produced for the study dataset to reduce the effect of bias in sample selection and participant non-response. When these weights are used in analyses, greater weight is given to population groups that are under-represented in the sample, and less weight to groups that are over-represented in the sample. Weighting therefore ensures that the study sample more accurately represents the sampled population.

The sample weights were used in analyses presented throughout the Insights report's four empirical chapters. Cross-sectional or longitudinal weights were used when examining data from more than one wave. Analyses were conducted using Stata® svy (survey) commands, which take the clusters and strata used in the study design into account when producing measures of the reliability of estimates.

Additional chapter findings

Chapter 1

Table S1.1: Periods of data collection and sub-cohort/s surveyed for gambling behaviours, substance use and mental health measures used in this report

Measure	Wave	Available for cohort (adult/young men/boys)
Gambling	3	All
Harmful/hazardous drinking (AUDIT)	1, 2, 3	Adults
Past-year substance use	1, 2, 3	Adults
Current smoking status (tobacco)	1, 2, 3	Adults
Past-year depression	1, 2, 3	All
PHQ-9	1, 2, 3	All
Past-year anxiety	1, 2, 3	All
GAD-7	3	Adults
PWI	1, 2, 3	Adults

Table S1.2: Past year prevalence (%) of cocaine, ecstasy, cannabis and meth/amphetamine use, tobacco smoking and harmful drinking behaviours among adult gamblers, 2013/14, 2015/16 and 2020/21

Substance	2013/14				2015/16				2020/21			
	Among at-risk gamblers		Among non-problem gamblers		Among at-risk gamblers		Among non-problem gamblers		Among at-risk gamblers		Among non-problem gamblers	
	%	[95% CI]	%	[95% CI]	%	[95% CI]	%	[95% CI]	%	[95% CI]	%	[95% CI]
Any substance (excl. tobacco) (At-risk *N* = 676, Non-problem *N* = 2,210)	58.6**	[52.7, 64.2]	49.6	[46.3, 52.9]	58.2**	[52.2, 63.9]	47.3	[43.9, 50.6]	63.6***	[57.9, 68.9]	48.8	[45.5, 52.1]
Harmful drinking (At-risk *N* = 492, Non-problem *N* = 1,599)	55.5*	[48.9, 62.0]	45.8	[42.3, 49.4]	53.5**	[47.0, 60.0]	41.9	[38.3, 45.5]	54.8***	[48.2, 61.1]	40.9	[37.4, 44.5]
Any illicit drug (At-risk *N* = 588, Non-problem *N* = 1,948)	30.7*	[25.2, 36.8]	23.2	[19.9, 26.9]	35.6**	[29.5, 42.2]	25.5	[22.0, 29.3]	38.4***	[32.4, 44.8]	25.8	[22.5, 29.5]
Cannabis (At-risk *N* = 583, Non-problem *N* = 1,957)	27.6*	[22.5, 33.3]	21.3	[18.2, 24.8]	29.3*	[23.8, 35.6]	21.6	[18.4, 25.1]	28.1*	[23.0, 33.9]	20.3	[17.3, 23.6]
Cocaine (At-risk *N* = 657, Non-problem *N* = 2,153)	6.4	[4.1, 9.8]	4.7	[3.4, 6.5]	9.3	[6.1, 14.1]	6.9	[5.3, 8.9]	14.8**	[11.0, 19.7]	8.8	[7.1, 10.9]
Ecstasy (At-risk *N* = 658, Non-problem *N* = 2,145)	7.4	[4.9, 11.0]	4.6	[3.3, 6.5]	11.0	[7.4, 16.0]	6.7	[4.6, 9.7]	9.4*	[6.4, 13.5]	5.2	[3.2, 8.1]
Meth/amphetamine (At-risk *N* = 506, Non-problem *N* = 1,777)	7.6**	[4.7, 11.9]	3.1	[2.1, 4.4]	14.8***	[10.0, 21.3]	4.1	[3.0, 5.7]	12.4***	[8.2, 18.4]	3.1	[1.9, 4.9]
Currently smoke (At-risk *N* = 403, Non-problem *N* = 1,304)	37.0**	[30.0, 44.7]	26.5	[23.1, 30.2]	38.1**	[31.0, 45.7]	26.6	[23.0, 30.5]	33.8**	[26.8, 41.6]	22.8	[19.5, 26.5]

Notes: CI = confidence interval. Asterisks (*) denote significant differences between at-risk/problem gambling (ARPG) and non-problem gambling groups in the corresponding wave, *$p < .05$, **$p < .01$, ***$p < .001$. Chi-square tests were used for significance testing. 'Any illicit' was derived from cannabis, cocaine, meth/amphetamine and ecstasy variables, coded '1' if used any of these substances, and '0' if a participant nominated 'no' for one or more of these substances and had missing data for the rest. 'Any substance' was derived from harmful drinking and 'Any illicit' variables, coded '1' if used any of these substances, and '0' if a participant nominated 'no' for one or more of these substances and had missing data for the rest.

Source: TTM data, Waves 1, 2 and 3, weighted using longitudinal sample weight between Wave 2 and Wave 3; Includes adults (aged 18+) at Wave 1 who gambled at Wave 3. Balanced data for each row, i.e. cases who had valid data for PGSI and substance use for all three waves.

Table S1.3: Mental health of men (18–62 years) across three waves who gambled in 2020/21, 2013/14, 2015/16 and 2020/21

Condition	2013/14				2015/16				2020/21			
	Among at-risk gamblers		Among non-problem gamblers		Among at-risk gamblers		Among non-problem gamblers		Among at-risk gamblers		Among non-problem gamblers	
	%	[95% CI]	%	[95% CI]	%	[95% CI]	%	[95% CI]	%	[95% CI]	%	[95% CI]
Past-year depression (%) (At-risk *N* = 712, Non-problem *N* = 2,250)	15.7***	[12.2, 20.1]	9.3	[7.8, 11.0]	19.8***	[15.6, 24.9]	10.5	[8.6, 12.7]	16.1***	[12.4, 20.6]	8.9	[7.3, 10.8]
Moderate to severe depression (PHQ-9) (At-risk *N* = 715, Non-problem *N* = 2,223)	16.1***	[12.4, 20.7]	8.8	[7.3, 10.6]	16.6**	[12.8, 21.3]	10.1	[8.2, 12.4]	20.6***	[16.5, 25.4]	11.5	[9.6, 13.8]
Past-year anxiety (%) (At-risk *N* = 714, Non-problem *N* = 2,243)	10.4**	[7.4, 14.3]	5.8	[4.6, 7.2]	11.8**	[8.7, 15.8]	6.3	[5.0, 7.8]	8.1	[5.9, 11.1]	7.2	[5.8, 8.7]
Moderate to severe anxiety (GAD-7)[a] (At-risk *N* = 805, Non-problem *N* = 2,479)	-	-	-	-	-	-	-	-	12.8**	[10.0, 16.4]	7.7	[6.2, 9.4]
PWI (At-risk *N* = 646, Non-problem *N* = 2,104)	67.0***	[65.1, 69.0]	72.4	[71.4, 73.2]	65.8***	63.8, 67.7	70.3	69.4, 71.3	65.3***	63.2, 67.5	72.2	71.2, 73.2

Notes: [a]Not assessed at Waves 1 and 2 of TTM; CI = confidence interval; Asterisks (*) denote significant differences between at-risk and non-problem gambling groups, *$p < .05$, **$p < .01$, ***$p <. 001$, Chi-square tests were used for significance testing.

Source: TTM data, Waves 1, 2 and 3; adult gamblers at W3, weighted. Balanced data for each row, i.e. cases who had gambled at W3 and had valid data for all three waves. GAD-7 available only for Wave 3. PWI asked of adults only.

Table S1.4: Multivariable Model 1: Socio-demographic predictors of at-risk or problem gambling (ARPG) among men (18–63) who gambled in the past 12 months, 2020/21

Characteristics	aOR	SE	[95% CI]
Age (ref. = 55–63)			
18–24	1.59**	0.28	[1.12, 2.26]
25–34	1.51**	0.24	[1.12, 2.06]
35–44	1.24	0.18	[0.93, 1.64]
45–54	1.19	0.16	[0.92, 1.56]
Aboriginal and/or Torres Strait Islander	1.60	0.47	[0.90, 2.85]
Born outside Australia	0.88	0.12	[0.67, 1.16]
Language other than English	1.38	0.37	[0.81, 2.35]
ASGS region (ref. = major city)			
Inner regional	0.96	0.11	[0.77, 1.20]
Outer regional	0.95	0.13	[0.73, 1.23]
Partnered (ref. = no)	0.66**	0.08	[0.52, 0.83]
Highest qualification (ref. = less than year 12)			
Year 12 or equivalent	0.91	0.16	[0.64, 1.30]
Cert./diploma/other	0.76	0.12	[0.57, 1.03]
Bachelor or higher	0.72*	0.12	[0.52, 1.00]
Employed (ref. = no)	0.68*	0.11	[0.50, 0.94]
Annual combined household income (ref. = less than $50,000)			
$200,000 or more	0.68*	0.12	[0.48, 0.97]
$150,000–$199,999	0.91	0.17	[0.64, 1.30]
$100,000–$149,1000	0.77	0.12	[0.56, 1.05]
$50,000–$99,999	0.79	0.12	[0.58, 1.07]
Constant	0.81	0.18	[0.53, 1.25]

Notes: *N* = 2,760; aOR = adjusted odds ratio; ASGS = Australian Statistical Geography Standard; CI = confidence interval. Partnered included being in a relationship, engaged or married, or living with a partner; original categories of unemployed and looking for work and out of labour force (Table S1.1) were combined into 'unemployed'. *$p < .05$, **$p < .01$

Source: TTM data, Wave 3, adult cohort, unweighted

Chapter 2

Depressive symptoms transitions between 2013/14 and 2020/21

Table S2.1: Transition matrix of PHQ categories between 2013/14 (Wave 1) and 2020/21 (Wave 3)

	2020/21 (Wave 3)				
2013/14 (W1)	No or minimal	Mild	Moderate	Moderately severe	Severe
No or minimal	79.9	15.7	3.1	0.9	0.4
Mild	45.8	36.8	12.4	3.6	1.4
Moderate	24.3	35.4	21.2	14.5	4.6
Moderately severe	15.4	30.0	26.2	15.4	13.1
Severe	17.6	13.5	21.6	24.3	23.0

Notes: A transition matrix containing percentages of men in each PHQ-9 category in 2013/14 (rows) that transitioned to PHQ-9 categories in 2015/16 (columns). Green cells indicate reduced depressive symptoms over time; yellow cells indicate remaining in the same category over time; red cells indicate heightened depressive symptoms over time.

Source: TTM, Waves 1 and 3, adult cohort with Medicare linkage, unweighted

Medicare data linked to the TTM survey: MBS and PBS

While most adult TTM participants provided consent for Medicare data linkage with their survey responses, it is important to describe the socio-economic, health and demographic characteristics of these men in comparison to men who did not consent; that is, for whom there is no linked health care data. To this end, Table S2.2: Socio-economic, health and demographic characteristics by Medicare linkage consent presents the average values or proportions of these characteristics by linkage consent across the first two columns, with differences shown in the final column.

A few differences arise between men by their consent status to Medicare data linkage. Men who did not consent to linkage (and are not included for analysis in the remainder of this chapter) tended to have lower PHQ scores and higher Conformity with Masculine Norms Inventory (CMNI) scores, although the magnitude of these differences are small in relation to the range of possible scores for these measures (0–27 and 0–66 respectively). Men who did not consent also tended to be slightly younger, not have completed a university degree, resided in outer regional areas, and were more likely to have a culturally and linguistically diverse (CALD) background. The proportion of TTM participants with functional difficulty and/or disability was not significantly different based on consent to data linkage.

Since analysis on mental health care relies on consent to Medicare data linkage, the chapter focuses only on men who provided consent to Medicare data linkage.

Table S2.2: Socio-economic, health and demographic characteristics by Medicare linkage consent

	w/ Medicare linkage	w/o Medicare linkage	Difference
PHQ-9 depression Score (0–27)	4.52	4.25	-0.27**
CMNI Score (0–66)	27.31	27.90	0.59***
Age group in years			
18–24	0.14	0.15	0.00
25–34	0.22	0.24	0.03***
35–44	0.30	0.31	0.01
45–57	0.35	0.30	-0.04***
Education			
Less than Year 12	0.14	0.17	0.03***
Year 12/Certificate	0.59	0.62	0.02**
University	0.27	0.21	-0.06***
Employment status			
Employed	0.86	0.85	-0.00
Unemployed	0.08	0.09	0.01**
Not in labour force	0.07	0.05	-0.01**
Financial hardships	0.61	0.63	0.02
Marital status			
Never married	0.26	0.27	0.01
Widowed	0.00	0.00	0.00
Divorced	0.04	0.04	-0.00
Separated but not divorced	0.03	0.02	-0.00
Married/de facto	0.67	0.66	-0.01
Area of residence			
Major city	0.60	0.58	-0.02
Inner regional	0.22	0.22	-0.00
Outer regional	0.18	0.20	0.02**
Remote/Very remote	0.00	0.00	0.00
Has functional difficulty and/or disability	0.07	0.08	0.01
Aboriginal and/or Torres Strait Islander (yes)	0.02	0.03	0.01
CALD	0.43	0.46	0.03**
Observations	8,887	5,009	13,896

Notes: CALD = Culturally and linguistically diverse; CMNI = Conformity to Masculine Norms Inventory; PHQ-9 = Patient Health Questionnaire. Table displays averages for PHQ and CMNI scores, and proportions in each socio-demographic category for TTM adults in Wave 1 who consented to Medicare linkage (first column) and did not consent to Medicare linkage (second column). The third column displays the difference between these values, with significance stars *$p < 0.1$ **$p < 0.05$, ***$p < 0.01$.

Source: TTM, Wave 1, adult cohort

Linear probability model estimation results

Table S2.3: Linear probability model results on no mental health care two years following survey in 2013/14 and 2015/16, by PHQ-9 category

	None to Mild	Moderate to Severe
Constant (Reference case probability)	0.875***	0.658***
	(0.02)	(0.05)
Age:		
18–24	(Reference)	(Reference)
	---	---
25–34	-0.036**	-0.087**
	(0.02)	(0.04)
35–44	-0.061***	-0.066
	(0.02)	(0.05)
45+	-0.061***	-0.095**
	(0.02)	(0.05)
Education:		
Less than Year 12	(Reference)	(Reference)
	---	---
Year 12/Certificate	0.020	0.020
	(0.01)	(0.03)
University	0.021	0.067
	(0.01)	(0.04)
Employment status:		
Employed	(Reference)	(Reference)
	---	---
Unemployed	-0.095***	-0.075**
	(0.02)	(0.04)
Not in labour force	-0.140***	-0.208***
	(0.02)	(0.03)
Financial hardships	-0.039***	-0.025***
	(0.00)	(0.01)
Marital status:		
Never married	(Reference)	(Reference)
	---	---
Married/De facto	0.015	0.029
	(0.01)	(0.03)
Divorced/Separated/Widowed	-0.060***	-0.048
	(0.02)	(0.04)
Area of residence:		
Major cities	(Reference)	(Reference)
	---	---
Regional/Remote	-0.002	-0.018
	(0.01)	(0.03)
Std. CMNI score	0.012***	0.034***
	(0.00)	(0.01)

Table continued over page →

	None to Mild	Moderate to Severe
With disability	-0.095***	-0.117***
	(0.02)	(0.03)
Aboriginal and/or Torres Strait Islander (yes)	-0.062*	-0.124**
	(0.03)	(0.06)
CALD	0.025***	0.032
	(0.01)	(0.03)
Surveyed 2013/14	(Reference)	(Reference)
	---	---
Surveyed 2015/16	-0.017***	-0.060***
	(0.01)	(0.02)
Observations	12,683	1,803

Notes: Coefficient estimates, standard error in parentheses, and significance stars (*p < 0.1 **p < 0.05 ***p < 0.01) from linear probability models on accessing any mental health service/prescription within two years of interview. CALD = Culturally and linguistically diverse; CMNI = Conformity to Masculine Norms Inventory.

Source: TTM, Waves 1 and 2, adult cohort and linked Medicare data from MBS and PBS.

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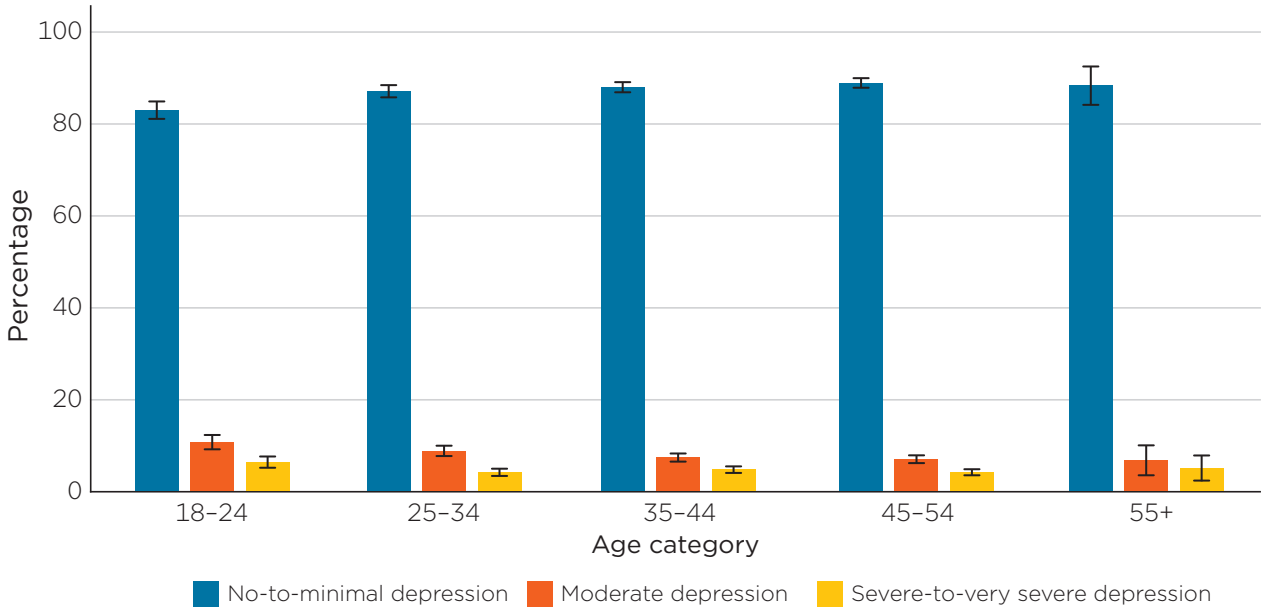
Chapter 3

Table S3.1: Drug types asked at each TTM data collection wave for adult participants

Drug	Data collection wave		
	1 (2013/14)	2 (2015/16)	3 (2020/21)
Amphetamines[a]	●	●	
Cannabis	●	●	●
Cocaine	●	●	●
Ecstasy	●	●	●
GHB			●
Hallucinogens			●
Heroin	●		●
Ice/crystal methamphetamine			●
Inhalants			●
Injecting drug use	●		
Ketamine			●
Other meth/amphetamines[b]			●
Other opiates (narcotics)[c]	●		
Other psychoactive/synthetic drugs[d]			●
Non-medical use of anabolic steroids			●
Synthetic cannabis			●

Notes: [a] Included use of speed, crystal methamphetamine, methamphetamine, ice other than for medical reasons. [b] Included speed, powder meth, whiz, goey. [c] Included methadone, morphine or pethidine other than for medical reasons. [d] Included drugs that have been designed to mimic established illicit drugs, such as party pills, research chemicals.

Figure S3.1: Distribution of PHQ-9 categories among TTM participants aged 18–55, by age category, in 2013/14



Notes: *N* = 10,791; only comprises participants included in the multivariable model detailed in Table 3.4.
Source: TTM data, Wave 1, adult cohort, unweighted

Comparisons with NDSHS estimates: Cannabis, cocaine, ecstasy and meth/amphetamine

Cannabis

Both TTM and NDSHS data indicate that rates of past-year cannabis use were highest among young adult Australian males, with prevalence decreasing with age (see Table S3.2 below). For example, TTM data estimated that around one-third (34%) of Australian men aged 18–24 had used cannabis at least once in the past year in 2015/16, compared to 19% of those aged 25–34, 16% of males aged 35–44, and 12% each of men aged 45–54 and 55–64. Likewise, in 2016, NDSHS findings estimated that one-quarter of men aged 18–24 had used cannabis at least once in the past year, compared to around 20% of those aged 25–34, 15% of males aged 35–44, 13% of men aged 45–54 and 7% of those aged 55–64.

Both studies pointed to a relatively stable prevalence of recent cannabis use among each age group across time points. One exception, however, was an increase in the estimated prevalence of use among males aged 25–34 according to TTM data between 2013/14 and 2020/21: 18% (95% CI: 15, 21) vs 27% (95% CI: 23, 31), respectively.

Table S3.2: Past-year prevalence estimates of cannabis use among adult Australian males, NDSHS vs TTM data, by age group, % [95% CI]

Age group	2013 NDSHS *N* = 7,325	2013/14 TTM *N* = 13,304	2016 NDSHS *N* = 7,328	2015/16 TTM *N* = 10,506	2019 NDSHS *N* = 6,683	2020/21 TTM *N* = 7,480
18–24	25.9 [22.5, 29.5]	31.0 [26.1, 36.3]	25.0 [21.6, 28.7]	33.5 [26.8, 40.8]	30.1 [26.3, 34.2]	38.1 [33.2, 43.3]
25–34	20.2 [17.8, 22.7]	18.1 [15.3, 21.2]	20.3 [17.8, 22.9]	19.2 [15.6, 23.5]	22.5 [19.9, 25.5]	27.0 [23.3, 31.1]
35–44	13.7 [12.0, 15.6]	16.0 [13.8, 18.4]	15.1 [13.3, 17.1]	16.3 [13.6, 19.4]	16.7 [14.5, 19.1]	16.4 [13.6, 19.6]
45–54	10.3 [8.8, 12.0]	12.0 [10.2, 14.1]	13.4 [11.6, 15.4]	12.2 [10.4, 14.2]	13.9 [12.0, 16.0]	14.6 [12.6, 16.8]
55–64[a]	6.9 [5.6, 8.5]	8.5 [4.7, 14.9]	7.4 [6.2, 8.9]	11.5 [7.7, 16.6]	8.4 [7.1, 10.0]	10.5 [8.6, 12.7]

Notes: NDSHS = National Drug Strategy Household Survey. [a] Comprises TTM participants aged 55–63 in 2020/21.
Source: NDSHS data, years: 2013, 2016, 2019, weighted; TTM data, Waves 1–3, adult cohort, unbalanced sample, weighted

Cocaine

Both TTM and NDSHS data indicate that rates of past-year cocaine use were highest among younger (18–34 years) adult Australian males, with lower prevalence rates among older men (see Table S3.3: Past-year prevalence estimates of cocaine use among adult Australian males, NDSHS vs TTM data, by age group, % [95% CI]). For example, TTM data estimated that around 7% and 12% of Australian men aged 18–24 and 25–34, respectively, had used cocaine at least once in the past year in 2015/16, compared to 5% of those aged 35–44, and around 1% of men aged both 45–54 and 55+. Likewise, NDSHS findings from data collected in 2016 estimated that around 6% and 7% of men aged 18–24 and 25–34, respectively, had used cocaine in the past year, compared to 5% of men aged 35–44, 2% of those aged 45–54, and less than 1% of those aged 55+. Cocaine use peaked in the 25–34 year age group in all data collection years for both studies except for 2019 (NDSHS) and 2020/21 (TTM), when higher usage rates were estimated for the 18–24 age group.

Table S3.3: Past-year prevalence estimates of cocaine use among adult Australian males, NDSHS vs TTM data, by age group, % [95% CI]

Age group	2013 NDSHS *N* = 7,262	2013/14 TTM *N* = 13,521	2016 NDSHS *N* = 7,324	2015/16 TTM *N* = 10,602	2019 NDSHS *N* = 6,683	2020/21 TTM *N* = 7,488
18–24	5.4 [3.7, 7.7]#	3.5 [2.4, 5.2]	5.7 [4.0, 8.0]#	6.8 [4.4, 10.4]	13.0 [10.3, 16.4]	21.1 [17.1, 25.7]
25–34	7.4 [5.9, 9.2]	7.9 [6.1, 10.2]	7.3 [5.9, 9.0]	11.7 [7.8, 17.2]	11.2 [9.4, 13.3]	15.5 [12.6, 19.0]
35–44	3.7 [2.9, 4.9]	5.2 [3.8, 7.0]	4.6 [3.6, 5.8]	5.3 [4.0, 7.2]	7.6 [6.2, 9.5]	7.7 [5.8, 10.0]
45–54	1.5 [1.0, 2.3]#	1.5 [0.9, 2.7]#	1.8 [1.2, 2.6]#	1.3 [0.8, 2.1]	3.5 [2.6, 4.7]	4.1 [2.9, 5.7]
55–64[a]	0.4 [0.2, 0.9]#	N/A[b]	0.5 [0.3, 1.0]#	1.3 [0.4, 4.1]#	0.8 [0.4, 1.4]#	0.7 [0.4, 1.3]#

Notes: NDSHS = National Drug Strategy Household Survey. [a] Comprises TTM participants aged 55–63 in 2020/21. [b] 0 participants (of 283) in this age category reported recent cocaine use. # Cell size of *n* < 50, indicating some degree of uncertainty. The true difference between estimates obtained from TTM and NDSHS may therefore vary from that reported here.

Source: NDSHS data, years 2013, 2016, 2019: weighted; TTM data, Waves 1–3, adult cohort, unbalanced sample, weighted

Ecstasy

TTM and NDSHS data presented in Table S3.4: Past-year prevalence estimates of ecstasy use among adult Australian males, NDSHS vs TTM data, by age group, % [95% CI] indicate that rates of past-year ecstasy use were highest among young adult Australian males (18–24 years), with prevalence decreasing with age. For example, TTM data estimated that around 14% of Australian men aged 18–24 had used ecstasy at least once in the past year in 2015/16, compared to 7% of those aged 25–34, 4% of males aged 35–44, and less than 1% each of men aged 45–54 and 55 and over. Likewise, NDSHS findings from data collected in 2019 estimated that around 13% and 8% of men aged 18–24 and 25–34, respectively, had used ecstasy in the past year, compared to 4% of men aged 35–44, 2% of those aged 45–54, and less than 1% of those aged 55+. Ecstasy use peaked in the 18–24 year age group in all data collection years for both studies. According to TTM estimates, there was a significant increase in past-year ecstasy use among men aged 18–24 years between 2013/14 and 2020/21 (from 8% to 19%); in comparison, NDSHS estimates indicated that 11% of men in this age group had used ecstasy in the past year in 2013 and 13% in 2019 (the increase of around 2% was non-significant).

Table S3.4: Past-year prevalence estimates of ecstasy use among adult Australian males, NDSHS vs TTM data, by age group, % [95% CI]

Age group	2013 NDSHS *N* = 7,217	2013/14 TTM *N* = 13,499	2016 NDSHS *N* = 7,321	2015/16 TTM *N* = 10,595	2019 NDSHS *N* = 6,683	2020/21 TTM *N* = 7,486
18–24	10.7 [8.5, 13.5]	8.4 [6.1, 11.4]	7.4 [5.6, 9.7]	14.4 [10.1, 20.0]	12.6 [10.0, 15.7]	18.7 [15.2, 22.8]
25–34	7.8 [6.3, 9.6]	7.1 [5.3, 9.6]	5.4 [4.1, 6.9]	7.0 [5.3, 9.3]	8.0 [6.4, 10.0]	11.0 [8.5, 14.2]
35–44	1.8 [1.3, 2.5]#	3.0 [2.0, 4.5]	2.1 [1.5, 2.9]#	3.8 [2.5, 5.6]	3.5 [2.5, 5.0]#	3.2 [2.1, 4.7]
45–54	0.9 [0.5, 1.5]#	0.9 [0.4, 1.8]#	1.0 [0.6, 1.6]#	0.6 [0.4, 1.0]#	1.8 [1.1, 2.8]#	2.1 [1.2, 3.5]#
55–64[a]	0.2 [0.1, 0.6]#	1.3 [0.2, 8.9]#	0.6 [0.3, 1.2]#	0.8 [0.2, 2.8]#	** < 0.01#	0.2 [0.0, 0.6]#

Notes: NDSHS = National Drug Strategy Household Survey. [a] Comprises TTM participants aged 55–63 in 2020/21. # Cell size of *n* < 50, indicating some degree of uncertainty. The true difference between estimates obtained from TTM and NDSHS may therefore vary from that reported here.

Source: NDSHS data, years: 2013, 2016, 2019, weighted; TTM data, Waves 1–3, adult cohort, unbalanced sample, weighted

Meth/amphetamine

TTM and NDSHS data presented in Table S3.5: Past-year prevalence estimates of meth/amphetamine use among adult Australian males, NDSHS vs TTM data, by age group, % [95% CI] indicate that rates of past-year meth/amphetamine use over the last decade were highest among young adult Australian males, with prevalence seeming to decrease following age 25–34. For example, TTM data estimated that around 6–8% of Australian men aged 18–24 and 25–34 had used meth/amphetamine at least once in the past year in 2015/16, compared to 5% of those aged 35–44, 2% of men aged 45–54, and 1% of the 55–64 age group.

Estimates of past-year meth/amphetamine use remained relatively stable across data collection time points for both studies; however, NDSHS estimates for men aged 25–34 in both 2016 and 2019 were significantly lower than the prevalence of past-year use for men in this group in 2013 (4% and 3% vs 6%, respectively).

Table S3.5: Past-year prevalence estimates of meth/amphetamine use among adult Australian males, NDSHS vs TTM data, by age group, % [95% CI]

Age group	2013 NDSHS *N* = 7,264	2013/14 TTM *N* = 13,491	2016 NDSHS *N* = 7,391	2015/16 TTM *N* = 10,589	2019 NDSHS *N* = 6,692	2020/21 TTM *N* = 7,491
18–24	5.3 [3.8, 7.3]#	4.4 [2.8, 6.7]	2.7 [1.7, 4.3]#	7.5 [4.2, 13.0]	3.5 [2.1, 5.7]#	5.2 [3.4, 7.8]#
25–34	6.2 [4.9, 7.7]	6.2 [4.8, 7.8]	3.5 [2.5, 4.8]	6.4 [4.8, 8.4]	3.0 [2.1, 4.3]	4.5 [3.0, 6.8]#
35–44	3.1 [2.4, 4.1]	4.0 [3.0, 5.4]	2.6 [1.9, 3.6]	5.0 [3.7, 6.9]	2.6 [1.8, 3.8]	3.7 [2.3, 5.8]
45–54	1.4 [1.0, 2.2]#	2.1 [1.5, 3.0]	1.7 [1.1, 2.5]	2.0 [1.4, 2.9]	2.3 [1.6, 3.2]	2.8 [1.8, 4.2]#
55–64[a]	0.4 [0.2, 0.9]#	1.0 [0.3, 3.3]#	0.5 [0.3, 1.0]#	1.3 [0.5, 3.0]#	0.5 [0.3, 1.1]#	0.7 [0.3, 1.5]#

Notes: NDSHS = National Drug Strategy Household Survey. [a] Comprises TTM participants aged 55–63 in 2020/21. # Cell size of $n < 50$, indicating some degree of uncertainty. The true difference between estimates obtained from TTM and NDSHS may therefore vary from that reported here.

Source: NDSHS data, years: 2013, 2016, 2019, weighted; TTM data, Waves 1–3, adult cohort, unbalanced sample, weighted

Chapter 4

Table S4.1: Parameter estimates from a series of multinominal logistic regressions examining the relationship between natural disasters and anxiety at mild and moderate/severe levels, compared to no/minimal levels

Anxiety models																				
Anxiety Level (ref. no/minimal anxiety)	Bushfire[a]				Drought[a]				Flood[b]				Storm[b]				Cyclone			
	Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe	
	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE
Natural disaster	1.05	0.10	1.28	0.16	1.21	0.14	1.18	0.19	1.25	0.18	0.95	0.19	1.12	0.12	1.50**	0.21	1.58*	0.36	1.27	0.41
Any other disaster	1.33***	0.12	1.39**	0.17	1.20*	0.10	1.52***	0.16	1.25	0.10	1.66***	0.17	1.27**	0.11	1.40**	0.16	1.27**	0.10	1.56***	0.16
Socio-demographics																				
Age	0.87***	0.02	0.83***	0.03	0.87***	0.02	0.82***	0.03	0.87***	0.02	0.82***	0.03	0.87***	0.02	0.82***	0.03	0.87***	0.02	0.83***	0.03
CALD	0.91	0.08	0.81	0.10	0.91	0.08	0.81	0.10	0.89	0.08	0.83	0.10	0.90	0.08	0.82	0.10	0.89	0.08	0.84	0.10
Aboriginal and Torres Strait Islander	0.94	0.24	1.28	0.37	0.93	0.24	1.28	0.37	1.02	0.25	1.24	0.36	1.03	0.25	1.21	0.35	0.10	0.24	1.20	0.35
Single/separated/ widowed (ref. = Married/ engaged/de facto)	1.19*	0.10	1.40**	0.15	1.19*	0.10	1.39**	0.15	1.20*	0.10	1.39**	0.15	1.20*	0.10	1.40**	0.15	1.22*	0.10	1.40**	0.15
Employment (ref. = Employed)																				
Unemployed	1.39*	0.18	2.5***	0.38	1.39*	0.19	2.52***	0.38	1.39*	0.18	2.44***	0.37	1.39*	0.18	2.45***	0.37	1.40**	0.18	2.49***	0.38
Out of the labour force	1.54***	0.20	3.19***	0.46	1.55***	0.20	3.17***	0.46	1.66***	0.21	3.41***	0.48	1.66***	0.21	3.38***	0.48	1.66***	0.21	3.40***	0.48
Education Level (ref. = University degree)																				
Less than Year 12	1.07	0.12	1.22	0.18	1.08	0.12	1.23	0.19	1.09	0.13	1.23	0.18	1.08	0.12	1.22	0.18	1.08	0.12	1.22	0.18
Year 12	1.13	0.12	1.17	0.17	1.14	0.12	1.17	0.17	1.12	0.12	1.13	0.16	1.12	0.12	1.13	0.16	1.13	0.12	1.17	0.17
Certificate/ Diploma	1.20	0.09	1.16	0.13	1.20	0.09	1.16	0.13	1.19*	0.09	1.14	0.13	1.19*	0.09	1.15	0.13	1.19*	0.09	1.16	0.13

Table continued over page →

Anxiety Level (ref. no/minimal anxiety)	Anxiety models																			
	Bushfire[a]				Drought[a]				Flood[b]				Storm[b]				Cyclone			
	Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe	
	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE
SEIFA Index (ref. = High disadvantage)																				
Low disadvantage	1.36***	0.13	1.23	0.16	1.36***	0.13	1.23	0.16	1.35***	0.13	1.26	0.17	1.35***	0.13	1.26	0.17	1.37***	0.13	1.25	0.16
Middle disadvantage	1.07	0.09	1.10	0.13	1.06	0.09	1.10	0.13	1.07	0.08	1.09	0.13	1.06	0.08	1.10	0.13	1.08	0.09	1.11	0.13
ASGS Non-Metropolitan region of residence (ref. = Metropolitan)	1.12	0.08	1.07	0.11	1.12	0.08	1.08	0.11	1.10	0.08	1.07	0.10	1.11	0.08	1.05	0.10	1.10	0.08	1.06	0.10
State[a] (ref. = NSW)																				
Vic.	1.22*	0.10	1.04	0.12	1.22*	0.10	1.04	0.12	1.23*	0.10	1.05	0.12	1.22*	0.10	1.06	0.13	1.21*	0.10	1.04	0.12
Qld	1.01	0.10	1.03	0.14	1.02	0.10	1.03	0.14	1.01	0.10	1.05	0.14	1.01	0.10	1.04	0.14	0.99	0.10	1.02	0.14
ACT	0.87	0.22	0.97	0.31	-	-	-	-	-	-	-	-	0.86	0.22	0.93	0.31	-	-	-	-
WA	-	-	-	-	-	-	-	-	-	-	-	-	0.97	0.11	0.86	0.14	0.95	0.11	0.86	0.14
SA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.02	0.14	0.66	0.14
WA/SA	0.99	0.10	0.80	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WA/SA/ACT	-	-	-	-	0.98	0.09	0.81	0.11	-	-	-	-	-	-	-	-	-	-	-	-
WA/SA/Tas./ ACT	-	-	-	-	-	-	-	-	1.01	0.10	0.84	0.11	-	-	-	-	-	-	-	-
SA/Tas.	-	-	-	-	-	-	-	-	-	-	-	-	1.09	0.13	0.77	0.14	-	-	-	-
ACT/Tas./NT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.25	0.20	1.14	0.25

Notes: Models adjusted for age; CALD status; Aboriginal and Torres Strait Islander; employment status; education level; marital status; area disadvantage (SEIFA); region of residence; state or territory of residence. As indicated in table, all models control for other type of disasters (i.e. affected by other disaster). [a] Sample excludes NT, Tas.; [b] Sample excludes NT (see supplementary materials). ***p = <.001, **p = <.01, *p = <.05.

Source: TTM data, Wave 3

Table S4.2: Parameter estimates from a series of multinominal logistic regressions examining the relationship between natural disasters and depression at mild and moderate/severe levels, compared to no/minimal levels

Depression Level (ref. no/minimal anxiety)	Depression models																			
	Bushfire[a]				Drought[a]				Flood[b]				Storm[b]				Cyclone			
	Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe	
	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE
Natural disaster	1.22*	0.11	1.30*	0.15	1.15	0.13	1.04	0.15	1.05	0.15	1.02	0.17	1.18	0.12	1.27	0.16	1.35	0.31	1.04	0.31
Any other disaster	1.08	0.09	1.34**	0.14	1.19*	0.09	1.58***	0.15	1.20*	0.09	1.60***	0.15	1.13	0.09	1.38***	0.14	1.20*	0.09	1.57***	0.14
Socio-demographics																				
Age	0.84***	0.22	0.75***	0.03	0.84***	0.02	0.76***	0.02	0.84***	0.02	0.75***	0.02	0.84***	0.02	0.76***	0.02	0.84***	0.02	0.76***	0.02
CALD	1.01	0.08	0.74**	0.08	1.01	0.08	0.74**	0.08	1.00	0.08	0.75**	0.08	0.10	0.08	0.74**	0.08	0.10	0.08	0.75**	0.08
Aboriginal and Torres Strait Islander	0.87	0.23	1.28	0.33	0.86	0.22	1.29	0.33	0.96	0.24	1.28	0.32	0.96	0.24	1.27	0.32	0.95	0.23	1.25	0.32
Single/ separated/ widowed (ref. = Married/ engaged/ de facto)	1.76	0.14	2.14***	0.20	1.76***	0.14	2.12***	0.20	1.74***	0.14	2.15***	0.20	1.74***	0.14	2.14***	0.20	1.75***	0.14	2.16***	0.20
Employment (ref. = Employed)																				
Unemployed	1.62***	0.23	3.25***	0.47	1.63***	0.23	3.26***	0.47	1.66***	0.23	3.26***	0.47	1.65***	0.23	3.26***	0.47	1.65***	0.23	3.29***	0.47
Out of the labour force	1.52**	0.21	3.68***	0.50	1.52**	0.21	3.65***	0.50	1.58***	0.21	3.99***	0.53	1.58***	0.21	4.00***	0.53	1.60***	0.21	4.02***	0.53
Education Level (ref. = University degree)																				
Less than Year 12	1.18	0.14	1.54**	0.22	1.18	0.14	1.55**	0.22	1.19	0.14	1.59***	0.22	1.19	0.13	1.56***	0.22	1.20	0.14	1.57***	0.22
Year 12	1.04	0.10	1.29*	0.16	1.04	0.10	1.28*	0.16	1.05	0.10	1.26	0.16	1.05	0.10	1.27	0.16	1.06	0.11	1.30*	0.16
Certificate/ Diploma	1.20	0.09	1.37***	0.13	1.20*	0.09	1.36***	0.13	1.19*	0.09	1.33**	0.13	1.19*	0.09	1.34**	0.13	1.20*	0.09	1.35**	0.13

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Depression Level (ref. no/minimal anxiety)	Depression models																			
	Bushfire[a]				Drought[a]				Flood[b]				Storm[b]				Cyclone			
	Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe		Mild		Moderate/ Severe	
	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE	aOR	SE
SEIFA Index (ref. = High disadvantage)																				
Low disadvantage	1.21*	0.11	1.44**	0.17	1.22*	0.11	1.42**	0.17	1.22*	0.11	1.43**	0.17	1.22*	0.11	1.45**	0.17	1.23*	0.11	1.43**	0.17
Middle disadvantage	1.04	0.08	1.25*	0.13	1.04	0.08	1.24*	0.13	1.04	0.08	1.23*	0.13	1.04	0.08	1.25*	0.13	1.05	0.08	1.26*	0.13
ASGS Non-Metropolitan region of residence (ref. = Metropolitan)	1.14	0.08	1.06	0.09	1.15*	0.08	1.06	0.09	1.12	0.08	1.06	0.09	1.12	0.08	1.03	0.09	1.13	0.08	1.07	0.09
State[a] (ref. = NSW)																				
Vic.	1.19*	0.10	0.91	0.10	1.19*	0.10	0.91	0.10	1.19*	0.10	0.92	0.10	1.18*	0.10	0.90	0.10	1.19*	0.10	0.92	0.10
Qld	0.93	0.09	1.00	0.12	0.92	0.09	1.00	0.11	0.92	0.09	1.02	0.12	0.92	0.09	0.99	0.11	0.91	0.09	1.01	0.12
ACT	0.76	0.19	1.25	0.33	-	-	-	-	-	-	-	-	0.77	0.19	1.25	0.33	-	-	-	-
WA	-	-	-	-	-	-	-	-	-	-	-	-	1.05	0.11	0.87	0.13	1.05	0.11	0.90	0.13
SA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.84	0.12	0.68*	0.12
WA/SA	0.98	0.09	0.80	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WA/SA/ACT	-	-	-	-	0.96	0.09	0.84	0.10	-	-	-	-	-	-	-	-	-	-	-	-
WA/SA/Tas./ ACT	-	-	-	-	-	-	-	-	0.98	0.09	0.89	0.10	-	-	-	-	-	-	-	-
SA/Tas.	-	-	-	-	-	-	-	-	-	-	-	-	0.91	0.11	0.79	0.13	-	-	-	-
ACT/Tas./NT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.99	0.17	1.28	0.24

Notes: Models adjusted for age; CALD status; Aboriginal and Torres Strait Islander; employment status; education level; marital status; area disadvantage (SEIFA); region of residence; state or territory of residence. As indicated in table, all models control for other type of disasters (i.e. affected by other disaster). [a] Sample excludes NT, TAS; [b] Sample excludes NT (see supplementary materials). ***p = <.001, **p = <.01, *p = <.05.

Source: TTM data, Wave 3

Sample selection: Multinominal logistic regression analyses

The 'Prevalence of natural disasters' section details the role that location plays in the experiences of men affected by natural disasters in Australia. To summarise, the prevalence of men affected by bushfire, flood, storm, cyclone and/or drought varied considerably across Australian states and territories. Consequently, to make appropriate inferences about men's experience of natural disasters, a minimum representation of disaster-affected men from each state were included in the modelling of anxiety and depression outcomes. The following criteria were followed:

- Men were included in the analysis for a given disaster if the prevalence of that disaster in their state or territory of residence was greater than 5% (i.e. more than 379 men affected by given disaster in relevant state).
- Men were merged into one larger group if the prevalence of the relevant disaster in their state or territory was between 1% and 5% (i.e. between 76 and 378 men affected by given disaster in relevant state).
- Men were removed from the analysis if the prevalence of the relevant disaster in a state or territory was less than 1% (i.e. less than 75 men affected by given disaster in relevant state).

Table S4.3: States and territories included in analytic sample according to disaster type summarises the states and territories included in the analysis for each disaster type. For example, in the analysis of flood-related data, men from Victoria, Queensland and New South Wales were included and retained in three distinct categories. Men residing in ACT, Western Australia, South Australia and Tasmania were included but combined into a fourth category. Those from the Northern Territory were not included.

Table S4.3: States and territories included in analytic sample according to disaster type

State/ Territory	Type of disaster				
	Bushfire	Drought	Flood	Storm	Cyclone
Vic.	✓	✓	✓	✓	✓
Qld	✓	✓	✓	✓	✓
NSW	✓	✓	✓	✓	✓
ACT	✓	C	C	✓	C
WA	C	C	C	✓	✓
SA	C	C	C	C	✓
Tas.	x	x	C	C	C
NT	x	x	x	x	C

Notes: ✓ denotes men residing in given state or territory were included in sample; x indicates excluded from sample; C indicates included and combined with other states or territories marked the same.

Barriers to health care use: COVID-related reasons

TTM respondents were asked whether they had been unable to access health care in the past 12 months because they were not able to leave the house due to coronavirus restrictions or because services were restricted due to coronavirus. The proportion who responded 'Yes' to each question are shown in Table S4.4: Proportion of men unable to access health care for COVID-related reasons. There was no evidence that the proportion of positive responses was higher among men affected by disaster compared to those not affected (tested at the 5% level of significance).

Table S4.4: Proportion of men unable to access health care for COVID-related reasons

Type of disaster – affected by	*N*	Can't leave house	Services restricted
Bushfire	1,117	9.5	19.8
Drought	676	10.9	22.6
Flood	406	12.5	22.7
Storm	762	11.8	24.7
Cyclone	129	7.5	22.5
None	5,584	10.8	22.4

Source: TTM data, Wave 3, weighted