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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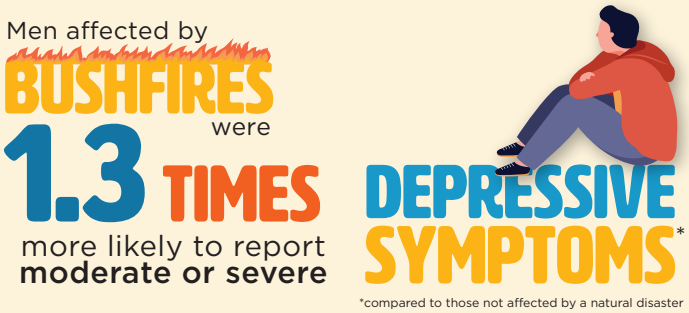
Key messages

- 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.

Acknowledgements

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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

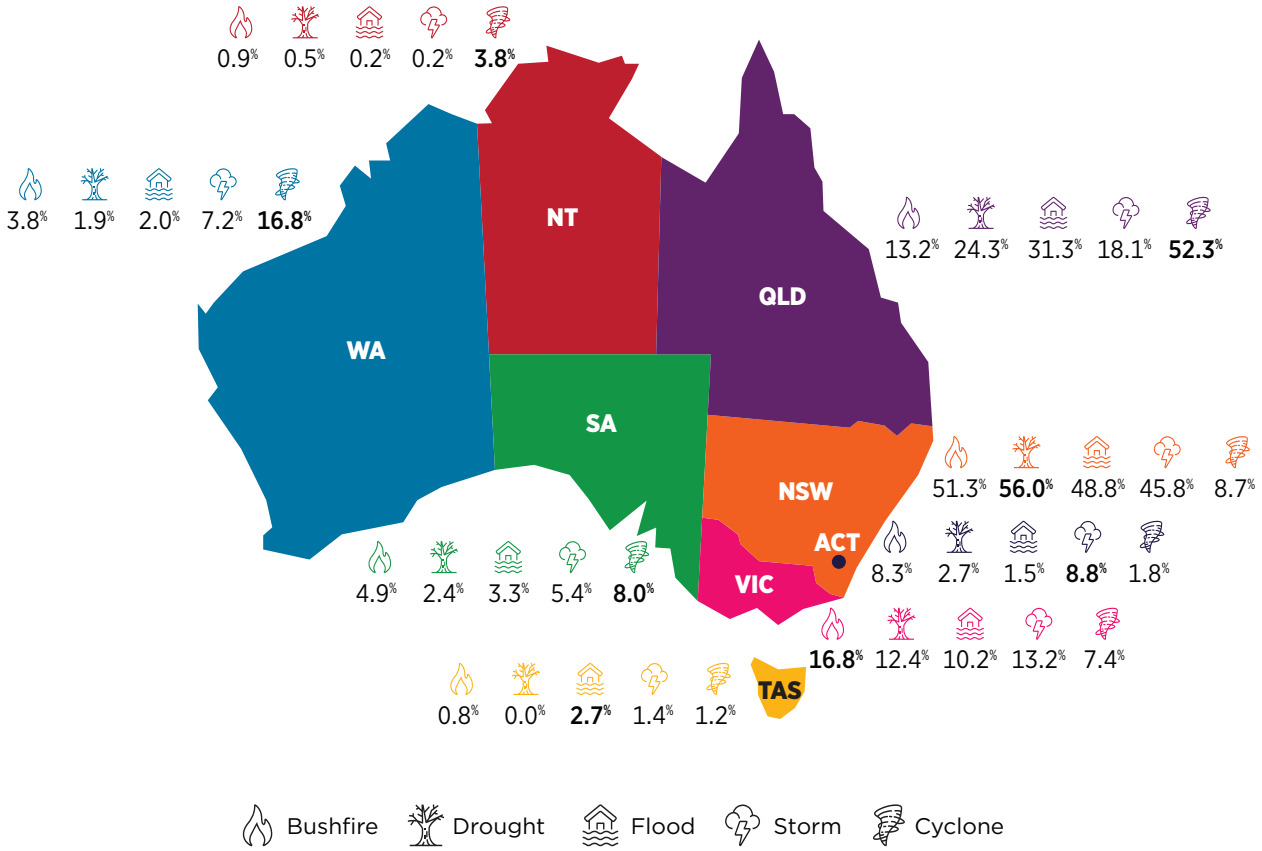
How did prevalence of natural disasters vary according to residential location?

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

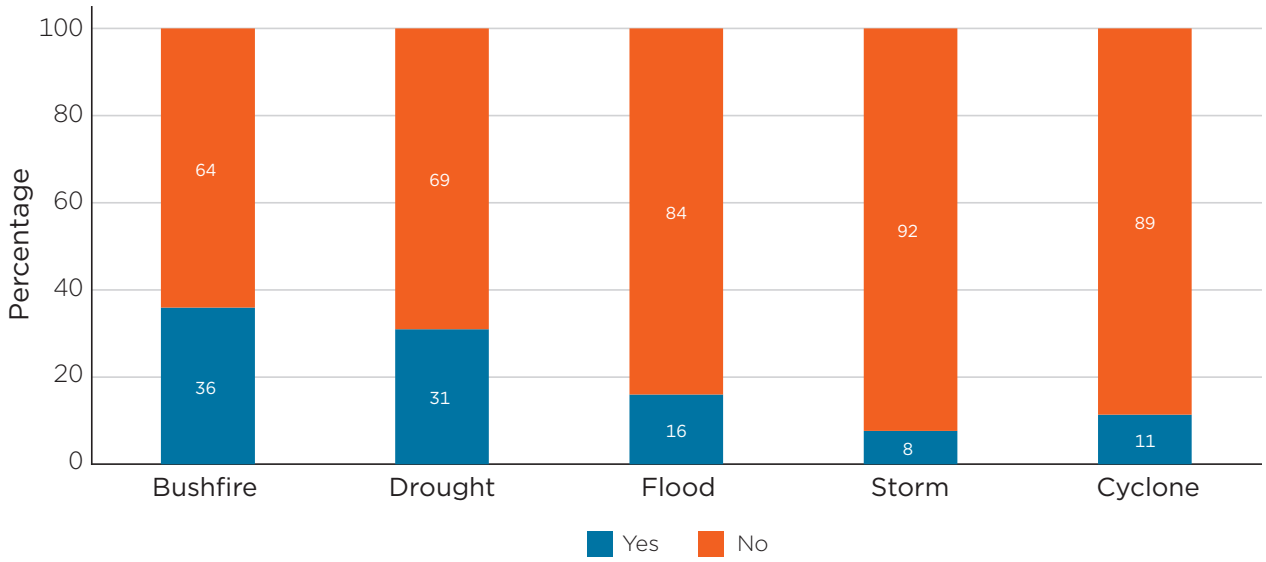
	Bushfire *N* = 1,110		Flood *N* = 400		Storm *N* = 753		Cyclone *N* = 126	
	% Yes	95% CI	% Yes	95% CI	% Yes	95% CI	% Yes	95% CI
Home threatened	34.6	[30.3, 39.1]	39.3	[31.2, 48.0]	34.6	[27.9, 41.9]	47.2	[33.1, 61.7]
Home damaged	5.0	[3.2, 7.8]	21.5	[15.4, 29.3]	46.1	[38.2, 54.2]	18.6	[10.2, 31.4]
Advised 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]

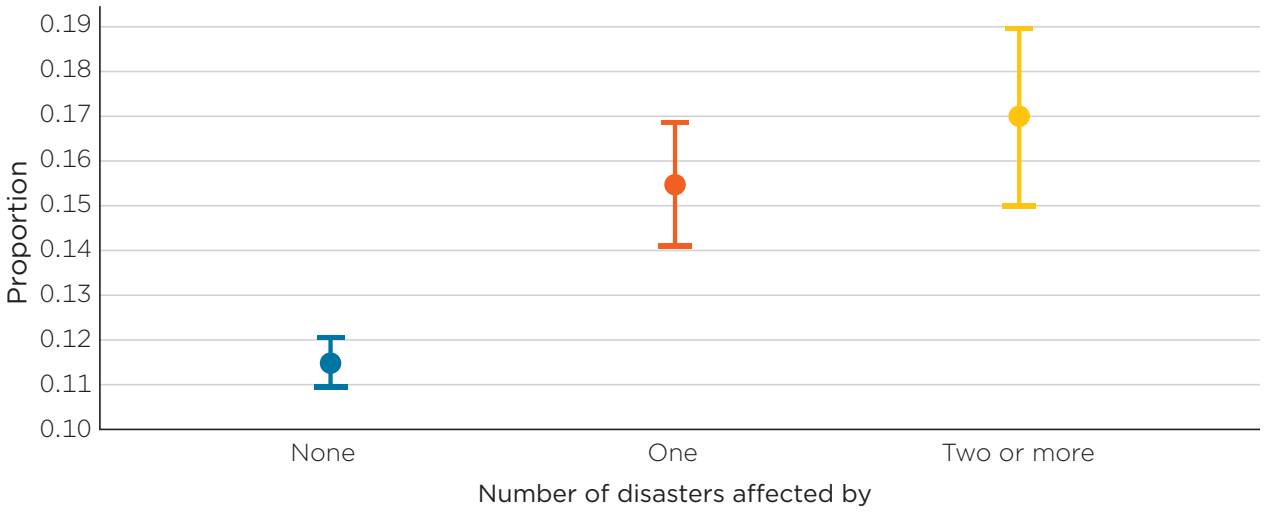
Notes: aOR = adjusted odds ratio; CI = confidence interval. Models adjusted for age; CALD status; Aboriginal and Torres Strait Islander identity; employment status; education level; marital status; area disadvantage (SEIFA); region of residence; state or territory of residence. As indicated in the table, 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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