AHURI Australian Housing and Urban Research Institute

PROFESSIONAL SERVICES

Homelessness amongst Australian contemporary veterans: pathways from military and transition risk factors

AUTHORED BY

Dr Amelia Searle
Dr Miranda Van Hooff
Dr Ellie Lawrence-Wood
Professor Andrew McFarlane
Centre for Traumatic Stress Studies, University of Adelaide

Dr Fiona Hilferty
Professor Ilan Katz
Mr Fredrick Zmudzki
Social Policy Research Centre, University of New South Wales

FOR

Australian Government Department of Veterans' Affairs

PUBLICATION DATE

May 2019

Acknowledgements
First and foremost, we acknowledge all current and ex-serving ADF personnel who generously gave their time to complete the study. This research was only made possible by their efforts and commitment to the study.

The research team would also like to acknowledge and thank all those who participated in and assisted with this research particularly Sharon Ride and Kym Connolly from the Australian Government Department of Veterans Affairs and Michael Fotheringham from the Australian Housing and Urban Research Institute for their contribution and guidance throughout the project.

Sincere thanks go to our three veteran researchers who were willing to join the project team. Ben Challinor, Adrian Talbot and Geoff Evans assisted greatly in the write-up and interpretation of data from all reports by sharing their expertise, gained from their own experiences as veterans and as providers of support for veterans in crisis.

Other key individuals involved in the conduct and the Transition and Wellbeing Research Programme include:

Principal Investigator
Dr Miranda Van Hooff (Lead), Director of Research, Centre for Traumatic Stress Studies, University of Adelaide.

Investigators
Dr Ellie Lawrence-Wood, Senior Research Fellow, Centre for Traumatic Stress Studies, University of Adelaide.

Dr Stephanie Hodson, National Manager, Veterans and Veterans Families Counselling Service, Department of Veterans' Affairs.

COL Nicole Sadler (Reservist), Senior Specialist, Military and High Risk Organisations, Phoenix Australia, Centre for Posttraumatic Mental Health, University of Melbourne.

Ms Helen Benassi, Mental Health, Rehabilitation and Psychology Branch, Joint Health Command, Department of Defence; PhD candidate, Australian National University.

Professor Alexander McFarlane, Professor of Psychiatry, Head of Centre for Traumatic Stress Studies, University of Adelaide.

Lead statistician
Dr Craig Hansen, Senior Statistician and Epidemiologist, Centre for Traumatic Stress Studies, University of Adelaide.

Statistician
Dr Blair Grace, Centre for Traumatic Stress Studies, University of Adelaide.

Transition and Wellbeing Research Programme Scientific Advisory Committee
RADM Jenny Firman (co-chair), Dr Ian Gardner (co-chair), Professor Ian Hickie, Professor Malcolm Battersby, Professor Mark Creamer, Professor Peter Butterworth, Professor Lyndall Strazdins, Dr Paul Jelfs, Dr Duncan Wallace, GPCAPT Lisa Jackson Pulver, Professor Tim Driscoll, Professor Kathy Griffiths, Professor Beverley Raphael, Dr Graeme Killer.

Centre for Traumatic Stress Studies, University of Adelaide

Dr Amelia Searle, Mr Roger Glenny, Ms Maria Abraham, Ms Jenelle Baur, Ms Ashleigh Kenny, Ms Marie Iannos, Dr Jodie Avery, Dr Elizabeth Saccone, Ms Jane Cocks, Mr Jeremy Hamlin, Ms Judy Bament, Ms Dianne Stewart.

Hunter Valley Foundation

Ms Shanti Ramanathan, Mr David Shellard, Dr Clare Hogue, Ms Phyllis Hartung, Mr Russ Redford and the team of CIDI interviewers.

Nexview Systems

Mr Trevor Moyle, Ms Hong Yan.

Australian Institute of Family Studies

Dr Galina Daraganova, Dr Jacquie Harvey.

Australian Institute of Health and Welfare

Mr Phil Anderson, Mr Nick Von Sanden, Mr Richard Solon, Mr Tenniel Guiver.

Australian Bureau of Statistics

Mr David Haynes, Ms Beatrix Forrest, Ms Michelle Ducat and staff from the Health and Disability Branch, Mr Barry Tynan and staff from the Communications and Dissemination Branch.

Transition and Wellbeing Research Programme Management Team

Ms Kyleigh Heggie, Ms Karen Barker, Dr Loretta Poerio, Ms Melissa Preston, Dr Carmel Anderson, Mr Tim Cummins, Ms Olivia Mahn, Ms Rachel McNab, Mr Christian Callisen, Department of Veterans' Affairs.

COL Laura Sinclair, Ms Jess Styles, Ms Kanny Tait, Department of Defence.

For their assistance in developing the Study Roll: Mr Mark Watson and Ms Megan MacDonald, Department of Veterans' Affairs, and Ms Carolina Casetta and Warrant Officer Class One Iain Lewington, Joint Health Command, Department of Defence.

Other key organisations

Australia Post.

Suggested citation

Searle, A., Van Hooff, M., Lawrence-Wood, E., Hilferty, F., Katz, I., Zmudzki, F. and McFarlane, A. (2019) *Homelessness amongst Australian contemporary veterans: pathways from military and transition risk factors*, Australian Housing and Urban Research Institute (AHURI), Melbourne.

Related reports and documents

This report forms part of AHURI's *Inquiry into homelessness amongst Australian veterans.* The other reports in the Inquiry are:

Van Hooff, M., Searle, A., Avery, J., Lawrence-Wood, E., Hilferty, F., Katz, I., Zmudzki, F. and McFarlane, A. (2019) *Homelessness and its correlates in Australian Defence Force veterans*, Australian Housing and Urban Research Institute, Melbourne.

Hilferty, F., Katz, I., Zmudzki, F., Van Hooff, M., Lawrence-Wood, E. and Evans, G. (2019) *Using the Specialist Homelessness Services Collection to examine veteran homelessness*, Australian Housing and Urban Research Institute, Melbourne.

Hilferty, F., Katz, I., Jops, P., Challinor, B., Talbot, A., Evans, G., Van Hooff, M., Lawrence-Wood, E. and Zmudzki, F. (2019) *Homelessness amongst Australian veterans: findings from the qualitative interviews*, Australian Housing and Urban Research Institute, Melbourne.

Hilferty, K., Katz, I., Van Hooff, M., Lawrence-Wood, E., Zmudzki, F., Searle, A. and Evans, G. (2019) *Homelessness amongst Australian veterans: Final project report*, Australian Housing and Urban Research Institute, Melbourne.

Hilferty, F., Katz, I. Zmudzki, F. Van Hooff, M., Lawrence-Wood, E. and Evans, G. (2019), *Using the Specialist Homelessness Services Collection to examine veteran homelessness*, Australian Housing and Urban Research Institute, Melbourne.

Hilferty, F., Katz, I., Van Hooff, M., Lawrence-Wood, E. and Zmudzki, F. (2017). *Inquiry into homelessness amongst Australian veterans: Discussion paper.* Australian Housing and Urban Research Institute, Melbourne.

Disclaimer

Copyright

Contents

List of tables

List of figures

Executive Summary

This study is one of the first to longitudinally examine multiple psychosocial and structural mechanisms of homelessness amongst recently transitioned Australian veterans (transitioned from full-time Regular ADF service between 2010 and 2014).

Results of this study confirmed the multifactorial nature of homelessness, with multiple predictors of homelessness emerging across various pre-military, military and transition time periods. A unique aspect of this study was the inclusion of several military phase variables, collected four years prior to becoming homeless. Thus, we could demonstrate temporal precedence for the associations between homelessness and PTSD symptoms, psychological distress, alcohol consumption and anger, as well as deployment experiences.

Almost all of the independent variables we examined showed significant covariate-adjusted associations with homelessness. These included: lifetime trauma (reported in 2015 but reaching back as far as childhood); PTSD symptoms, psychological distress, anger, and alcohol problems during the military; medically discharging, time since transitioning, trouble with the law following transition, becoming uncoupled following transition, and being unemployed following transition. These associations persisted even after adjusting for several relevant covariates.

When these variables were entered into a path analysis however, only becoming uncoupled since transition and experiencing unemployment since transition were directly associated with homelessness with psychological distress during military service showing an indirect effect through these variables.

These results suggest that working to reduce psychological distress (and related mental illness) as well as its negative impacts on relationships and employment following transition, may provide a useful point for identification of, and potential intervention with, at-risk Australian veterans by Defence, DVA and various other government and non-government agencies.

1 Introduction

1.1 Inquiry into homelessness amongst Australian veterans

The AHURI *Inquiry into homelessness amongst Australian veterans* was commissioned by the Department of Veterans' Affairs (DVA) at the end of 2016. The aim of the project is to provide a national estimate of veteran homelessness and examine the nature of homelessness for former Australian Defence Force (ADF) members.

As there is no single, robust source of information to examine veteran homelessness, the project employs a mixed methodology and draws on multiple data sources. There are four project components.

1. A rapid evidence review to examine benchmarks and best practice methods for monitoring homelessness amongst veteran groups, as well as best practice procedures and interventions to support homeless veterans.
2. Qualitative interviews with a sample of key stakeholders and veterans experiencing homelessness.
3. The linkage of two key datasets: an ADF dataset that identifies the veteran population (post 2001) and the Specialist Homelessness Services Collection (SHSC). The analysis of these datasets will provide comprehensive information on the mainstream services accessed by the veteran population.
4. A detailed analysis of existing data collected as part of the DVA- and Defence-funded Transition and Wellbeing Research Programme (TWRP) and Military Health Outcomes Program (MilHOP).

This report provides the longitudinal analysis of Component 4, by combining data from the TWRP and MilHOP. It aims, in part, to address the Inquiry research question, 'What are the risk and protective factors for homelessness amongst Australian veterans?' A previous report for this project (Van Hooff, Searle et al. 2019) provides the cross-sectional analysis of Component 4, using TWRP data only. Findings from the rapid evidence review (Component 1) are presented in an AHURI discussion paper (Hilferty, Katz, Van Hooff et al, 2017). Findings from the qualitative data (Component 2) are presented in Hilferty, Katz, Jops et al (2019). Findings from analysis of the linked dataset (Component 3) are presented in Hilferty, Katz, Zmudzki et al (2019). The final project report integrates findings from all four components (Hilferty, Katz, Van Hooff et al, 2019).

1.2 The current report

This report aims to examine the psychosocial and structural mechanisms of recent homelessness (i.e. during the last 12 months) amongst recently transitioned veterans. This aim, in part, addresses the broader Inquiry research question, 'What are the risk and protective factors for homelessness amongst Australian veterans?'.

Our study is well-placed to examine multiple longitudinal mechanisms of homelessness. Our longitudinal design, using both MilHOP and TWRP datasets, meant that deployment, mental health and risk behaviour data were assessed during full-time military service, and four years prior to becoming homeless, as determined via our measure of homelessness (see p. 12) (although this may not have been the first homelessness episode since transitioning). Moreover, the large-scale epidemiological design of the Defence studies utilised, which included attempting to recruit entire population cohorts using Defence contact details, meant that our sample was not limited to just those accessing veterans' and/or homelessness services, and yet was sufficiently large to document enough recent cases of homelessness

(generally a low-prevalence condition) to statistically model multiple pathways and adjust for several potential confounders.

This report consists of two broad components. First, hypothesised longitudinal and cross-sectional predictors of homelessness are examined independently. Second, several of these predictors are examined together in a longitudinal path model. Given the empirical and theorised associations and mechanisms reviewed here, and within the context of recent transition, we propose a broad model involving associations between variables across the 'military phase' (active service) and 'transition phase' (first five years after leaving Regular ADF service). More specifically, we hypothesise that homelessness may result from the pathways between mental health issues and risk behaviours (including anger and alcohol consumption) during military service, and structural support breakdown (e.g. relationship breakup and job loss/unemployment) following transition.

1.3 Literature review: pathways to homelessness amongst veterans

There is evidence that veterans are disproportionately at risk of homelessness compared to the general community, despite some recent progress towards prevention in this group (Fargo et al., 2012; Foreign Affairs Defence and Trade Committee Department of the Senate, 2016; U.S. Department of Housing and Urban Development, 2017). While the current state of affairs in Australia has been contentious due to the lack of appropriate statistics, new evidence would suggest that estimates of homelessness using a broad definition (encompassing primary, secondary and tertiary homelessness) in contemporary (i.e. recently transitioned) veterans are considerably higher than for the general population (Van Hooff et al., 2019).

Research into the risk factors for veteran homelessness has been steadily growing. A recent systematic review of 31 relevant United States (US) studies found the strongest and most consistent risk factors for homelessness were mental health issues and drug/alcohol abuse, followed by income-related factors (including unemployment, low income and money mismanagement) (Tsai and Rosenheck 2015). There was also some evidence to suggest that lack of social support (including relationship breakup), risk behaviours (including gambling and incarceration), and early life trauma were risk factors for homelessness (Tsai & Rosenheck, 2015). While many of the studies considered in that review were limited by cross-sectional data and small and/or treatment-seeking samples, often from previous eras, the findings support those from the handful of large retrospective cohort studies conducted. Although broad risk factors for homelessness appear similar for veterans and non-veterans, veterans' qualitative experiences of those factors may differ (e.g. unemployment following military discharge, compared with job loss broadly) (Balshem et al., 2011; Tsai & Rosenheck, 2015).

An important consideration is the extent to which these predictors of homelessness may be dependent on specific national contexts, given that international military forces differ in several key ways, including their social security and veterans' systems. In this vein, this Inquiry's cross-sectional report into the correlates of homelessness in recently transitioned Australian veterans (Van Hooff, Searle et al. 2019) aligns with the above-mentioned review of US literature: compared with not recently homeless veterans, recently homeless (i.e., in the last 12 months) veterans had experienced a higher prevalence of financial problems, unemployment, low social support, lifetime trauma exposure, trouble with the law, at-risk drinking, drug use, psychological distress, and depressive, post-traumatic stress disorder (PTSD) and anxiety symptoms (Van Hooff et al., 2019). Overall, these findings suggest that differences between US and Australian military forces (e.g. availability of mental health services, supported housing and supported employment programs, both generally and for veterans) had not had a substantial impact on the identified risk factors. However, these factors can only be considered as correlates amongst Australian veterans, rather than true

risk factors, given that cross-sectional data can only demonstrate associations between variables and cannot analyse trajectories into homelessness.

The identified risk factors rarely occur in isolation; accordingly, homelessness is thought to be multifactorial, resulting from multiple psychosocial and structural issues experienced over an extended time period, which all influence one another (Balshem et al., 2011; Hamilton et al., 2011; Rosenheck & Fontana, 1994). More specifically, veteran homelessness is assumed to result from the interplay between pre-military, military and post-military factors (Balshem et al., 2011; Hamilton et al., 2011; Rosenheck & Fontana, 1994). Despite this, most studies (including our cross-sectional report for this Inquiry) focus on the links between specific factors and homelessness, rather than the interplay between different risk factors over time (as noted recently by Hamilton, Poza et al. (2011) and Tsai and Rosenheck (2015)).

It is surprising that only one study (now over two decades old) has examined multiple mechanisms of veteran homelessness (Rosenheck & Fontana, 1994). Using data from the landmark National Vietnam Veterans' Readjustment Survey (NVVRS), Rosenheck and Fontana examined homelessness (defined as 'no regular place to live for at least a month or so') in 1,460 US male Vietnam veterans, who were surveyed at least 10 years after their discharge. Their model suggested that multiple factors from all four time periods (i.e. pre-military, military, initial adjustment and post-military) were associated with homelessness. Trauma/adversity in childhood, as well as psychiatric disorder, substance abuse, low support, and being unmarried following discharge all showed direct associations with homelessness. Moreover, both pre-military and military trauma variables (i.e. psychiatric disorder, substance abuse and being unmarried) were indirectly associated with homelessness through their effects on post-military factors. However, as the model was largely theoretical, with pathways determined mainly by the temporal sequencing of the variables, there were no hypothesised links *between* psychiatric disorder, substance abuse and being unmarried. It is worth noting that the *individual* pathways within this model are supported within the literature; in fact, a conceptual/heuristic model developed by integrating this piecemeal evidence (Balshem et al., 2011) resembles Rosenheck and Fontana's 1994 model, and thus provides supporting (but not direct) evidence that these types of indirect association are plausible.

Two notable qualitative studies on pathways to veteran homelessness also support such mechanisms, although the veterans' lived experiences speak to more complex and cyclical relationships than can be empirically tested (Hamilton et al., 2011; Metraux et al., 2017). Both studies involved focus groups amongst small samples of predominantly service-seeking veterans who were on the streets or living in temporary shelters. Hamilton, Poza et al. (2011) studied US females from Vietnam up until 9/11 conflict eras, whereas Metraux, Cusack et al. (2017) studied US males in the post-9/11 era. Despite their differences, both studies identified common themes of pre-military and military trauma, mental health issues, drug and alcohol abuse, relationship breakup and unemployment/job loss. Multiple complex mechanisms were evident in the veterans' experiences, described by Hamilton, Poza and colleagues as 'a host of mutually reinforcing challenges' and a 'web of vulnerability'. Metraux, Cusack et al. (2017) described how widespread mental health issues (and to a lesser degree substance abuse), which manifested in anger and anxiety, meant that many veterans struggled to hold a job, experienced relationship difficulties/breakup, and were impeded in help-seeking. The veterans overwhelmingly attributed their homelessness to these more proximal situational factors, and not their apparent psychosocial precursors.

In order to best develop interventions, researchers, policy-makers and service providers need to better understand the mechanisms associated with veteran homelessness, including associations between, and relative importance of, risk factors, and any indirect pathways. Thus, research testing longitudinal models with large non-help-seeking samples, and in contemporary (i.e. post-9/11-era) veterans, is greatly needed (Balshem et al., 2011; Tsai & Rosenheck, 2015).

Transitioning from military service represents a significant risk for homelessness. Our research focusses on veterans within the first five years after discharge from full-time military service, which is generally considered to represent the 'transition' period within veteran research (Pedlar & Thompson, 2016; Ray & Heaslip, 2011; Sheilds et al., 2016). This period is characterised by considerable flux, including leaving secure employment, military-subsidised housing and all-inclusive healthcare, as well as experiencing changes to identity, community of residence and social supports (Demers, 2011; Harvey et al., 2011; Hatch et al., 2013; Sayer et al., 2014; Sayer et al., 2010). Accordingly, studies have documented various civilian readjustment issues in this transition period, such as job loss/unemployment and family relationship difficulties, which could result in adverse mental health and wellbeing outcomes, including homelessness (Bergman et al., 2014; Burdett et al., 2013; Castro & Kintzle, 2014; Pease et al., 2016; Pedlar & Thompson, 2016; Sheilds et al., 2016; Wainwright et al., 2016). These readjustment issues could cause homelessness directly (not just indirectly through subsequent mental health declines) due to their structural nature; that is, having a permanent place to live requires money to pay rent/mortgage, and/or support from family/friends by means of providing somewhere to stay (Balshem et al., 2011; Hamilton et al., 2011).

1.4 Australian military datasets that could examine pathways to veteran homelessness

The Centre for Traumatic Stress Studies (CTSS) at The University of Adelaide has been working in partnership with the Department of Defence and the DVA for over a decade in order to examine the prevalence of mental disorder in current and transitioned ADF members, as well as to identify risk and protective factors for their mental health and wellbeing. This partnership has comprised two key programmes of research.

1 The Transition and Wellbeing Research Programme (TWRP), conducted in 2015, consists of an integrated suite of three key studies: the Mental Health and Wellbeing Transition Study, the Impact of Combat Study and the Family Wellbeing Study.[1] Together, these studies address the mental health and wellbeing of transitioned ADF members and their families, and examine the longitudinal course of mental health amongst currently serving and transitioned ADF members (Van Hooff et al., 2018). All those who transitioned out of full-time Regular ADF service in the five-year period between January 2010 and December 2014 (referred to herein as the 'Transitioned ADF') (N=24,932) were eligible for the 'Transitioned ADF' cohort. This eligible cohort was identified from a Military and Veteran Research Study Roll—generated specifically for this program from Defence personnel data, and DVA and Commonwealth Superannuation Corporation contact details, and cross-referenced against the National Death Index (NDI). We attempted to contact the 23,974 who had useable contact details, and 4,326 completed a questionnaire (an 18% response rate). As homelessness is often associated with mental health status and is a key outcome of concern amongst service providers, information about the homelessness status of the Transitioned ADF was collected as part of the Mental Health and Wellbeing Transition Study.[2]

[1] See https://www.dva.gov.au/health-and-wellbeing/research-and-development/social-research/transition-and-wellbeing-research.

[2] For detailed information pertaining to the Mental Health and Wellbeing Transition Study, including the study objectives, refer to the *Mental health prevalence* report Van Hooff, M., Lawrence-Wood, E., Hodson, S., Sadler, N., Benassi, H., Hansen, C., Grace, B., Avery, J., Searle, A., Iannos, M., Abraham, M., Baur, J. & McFarlane, A. (2018). *Mental Health*

2 The Military Health Outcomes Programme (MilHOP), conducted in 2010–12, consists of three interrelated studies which were combined to address the mental health and wellbeing of the entire currently serving Regular ADF population in 2010. These studies included the Middle East Area of Operations (MEAO) Census Study (of current and ex-serving ADF members who had deployed to the MEAO) (Dobson et al., 2012), the Mental Health and Wellbeing Study (examining the health and wellbeing of currently serving 2010 Regular ADF who had never deployed to the MEAO) (McFarlane et al., 2011), and the Prospective Study (examining the pre- and post-deployment mental health and wellbeing of ADF members who deployed to the MEAO between 2010 and 2012) (Davy et al., 2012).

Importantly, a considerable proportion of TWRP Mental Health and Wellbeing Transition Study participants also took part in the MilHOP. Thus, when linked together (for those participants who provided explicit consent to data linkage), these two datasets lend themselves to the examination of longitudinal pathways to veteran homelessness.

Prevalence, Mental Health and Wellbeing Transition Study, the Department of Defence and the Deparment of Veterans' Affairs Canberra..

2 Methodology

2.2 Participants

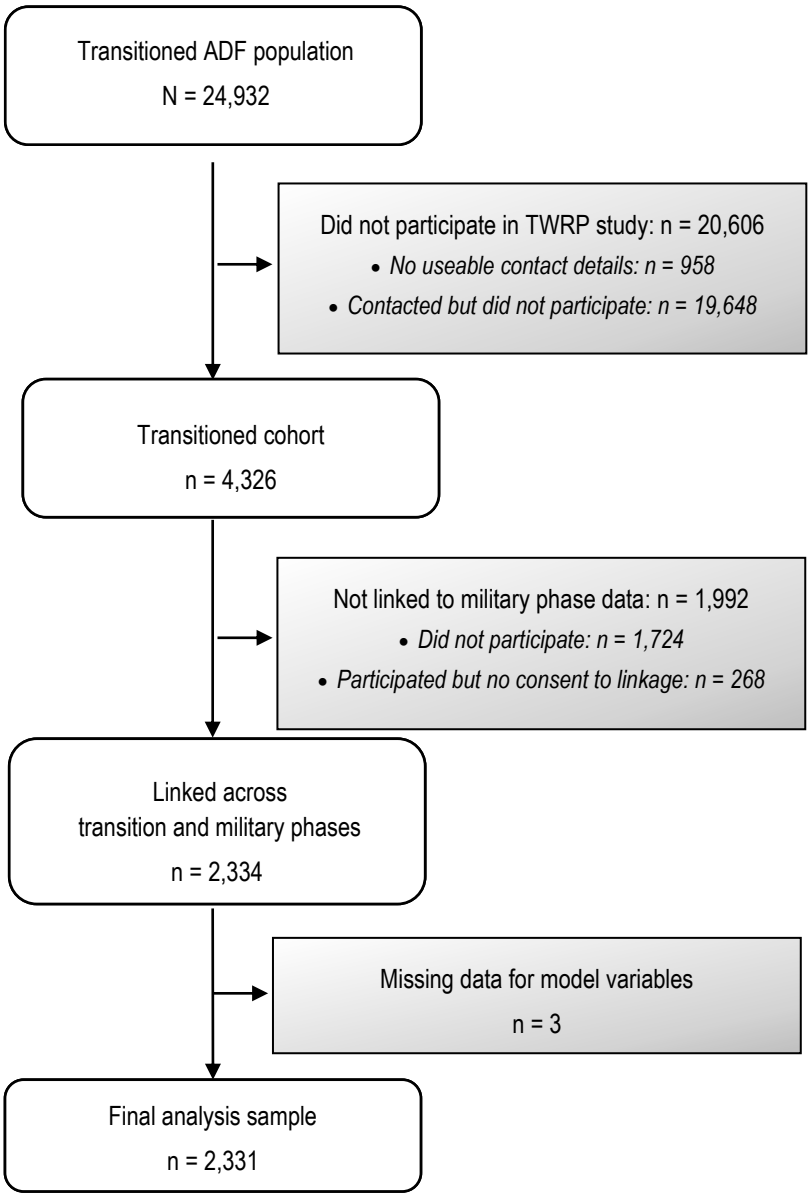
Participants were drawn from the 2015 Transition and Wellbeing Research Programme (TWRP). Subsequently, data for 2,334 of these 4,326 transitioned veterans were able to be linked to self-report data they had provided five years prior, within the 2010 Military Health Outcomes Program (MilHOP) (although an additional 268 veterans had participated in MilHOP, they did not provide consent for the analysis of linked data). The MilHOP provided prevalence estimates of recent (12-month) and lifetime diagnosable mental disorder in the Regular ADF in 2010, and an understanding of deployment-related health issues following deployment to the Middle East Area of Operations (MEAO) (Dobson et al., 2012; McFarlane et al., 2011). See Figure 1 for a visual representation of this participant flow.

2.3 Measures

2.3.1 Demographic variables

At both the military and transition phases, we collected information regarding participants' age, sex, Service (upon transition for the transition phase), rank (upon transition for the transition phase), relationship status (dichotomised into partnered or not), educational qualifications (dichotomised into tertiary educated or not), and length of ADF service (in years). Age, sex, Service and rank came from military records, whereas all other demographic variables were reported by participants. Ranks were grouped into: Other Ranks (Private to Corporal equivalents), Non-commissioned Officers (Sergeant to Warrant Officer equivalents) and Commissioned Officers (Lieutenant to General equivalents).

Figure 1. Participant flow: eligible cohort, data linkage results, and numbers included for analyses



2.3.2 Outcome variable: homelessness in the last 12 months (transition phase)

'Homelessness' status was calculated using an algorithm derived from the Australian Bureau of Statistics' (ABS') definition of homelessness (Australian Bureau of Statistics, 2012).[3] The algorithm used several questions within the self-report survey that were taken from the 2010 ABS General Social Survey (GSS) (Australian Bureau of Statistics, 2011). Two questions used in combination assessed *lifetime* homelessness. First, participants were asked whether they had ever experienced certain living circumstances due to not having a permanent place to live (e.g. stayed in a shelter, stayed with relatives). Second, participants answering 'yes' to any of these living circumstances were then asked to indicate the reason/s behind these circumstances—thus, homelessness outside one's own control (e.g. due to alcohol or drug use, or mental illness, indicating there was no viable housing alternative) could be identified, as opposed to not having a permanent place to live solely for reasons of personal choice (e.g. house sitting or saving money).

Participants who had been without a permanent place to live also answered two questions regarding (1) frequency and (2) recency of these episodes. Thus, amongst the participants who had experienced 'lifetime' homelessness, those whose indicated they were most recently without a permanent place to live 'less than 12 months ago' could be classed as experiencing *recent (12-month)* homelessness. For those who indicated they had been without a permanent place to live more than once, the reasons behind their most recent episode were verified to ensure that it was outside of their control (and thus within the definition of homelessness).

While this operationalisation of homelessness aligns broadly with the ABS statistical definition, it centres on stability in housing, as we did not have information regarding the adequacy of dwellings or control of social space (core components of the ABS definition). It is also important to note that neither the ABS definition nor ours distinguishes between the three levels of homelessness (i.e. primary, secondary and tertiary).

2.3.3 Predictor variables (military phase)

2.3.3.1 Deployment status

Participants' deployment status (i.e. 'ever deployed' versus 'never deployed') as at the military phase was determined through a three-stage process. First, if participants indicated within their self-report questionnaire that they had deployed on a specific operation (i.e. on one or more of the listed major deployments: Afghanistan, Iraq, Solomon Islands, East Timor, Bougainville, or any 'other operation'), they were

[3] According to the ABS definition, a person is considered to be homeless if: (1) their current living arrangement is in an inadequate dwelling, has no/limited tenure, or does not allow control of/access to space for social relations; *and* (2) the person has no suitable accommodation alternatives, and does not have the financial, personal, psychological or physical means to make another choice (i.e. they are not simply choosing to live on the streets) Australian Bureau of Statistics. (2012). *4922.0 Information Paper - A Statistical Definition of Homelessness* [Online]. Cat no. 4922.0 Canberra: Australian Bureau of Statistics. Available: http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/4922.0Main%20Features22012?opendocument&tabn

categorised as ‘deployed’. Second, if participants did not provide any response within the specific operation section, their response to the survey question ‘Have you been on an ADF operational deployment (war-like, peacekeeping, peace-monitoring or humanitarian support)?’ was used to determine if they had ever been deployed. Finally, if participants had also not responded to this question, then their Defence personnel data were consulted.

2.3.3.2 MEAO deployment trauma

Retrospective reports of trauma experienced on participants’ most recent MEAO deployment were completed using the MilHOP 26-item questionnaire, adapted from the Deployment Risk and Resilience Inventory (King et al., 2006), the King's College Gulf War Survey (Unwin et al., 1999) and the Traumatic Stressors Exposure Scale (TSES-R) (Swann & Hodson, 2004). Each trauma (e.g. experienced suicide bombing; went on combat patrols/ missions) was coded dichotomously (yes/no). The 26 items were grouped into nine broader exposure categories (e.g. coming under fire; handling/seeing dead bodies) based on previous US factor-analytic research on MEAO combat exposures (Thomas, 2010), and previous research on Australian veterans (Davy et al., 2012; Dobson et al., 2012) (see Appendix C for items and groupings). Any trauma experienced within each of these nine categories was summed to create a count of the number of deployment-related trauma types experienced, which could range from 0 to 9 (Dobson et al., 2012). Thus, this measure reflects the number, rather than frequency, of trauma types, and does not account for severity of the traumas experienced. Similar trauma count variables have consistently shown significant associations with mental health outcomes (e.g. (Phillips et al., 2010; Sareen et al., 2007). Given that this sample included ADF personnel who had never deployed (and thus were missing this variable), we then categorised this deployment trauma count variable into ‘0 traumas’, ‘1–5 traumas’ and ‘6–9 traumas’, and added a fourth ‘not MEAO deployed’ category to give all non-deployed participants a value for this now-nominal variable.[4]

2.3.3.3 Post-traumatic stress disorder (PTSD) symptoms

PTSD symptoms (according to the Diagnostic and Statistical Manual of Mental Disorders—version 4 criteria) were assessed using the Post-traumatic Stress Disorder (PTSD) Checklist—civilian version (PCL-C) (Weathers et al., 1993), which allows ratings to be based on any (not just military-related) trauma (Nicholson, 2006). Respondents rate symptoms (e.g. ‘feeling jumpy or easily startled’) in the past month, which, when summed, give a total score from 17 to 85, with higher scores indicating higher PTSD symptom levels. Overall, the PCL-C shows high validity and reliability (McDonald & Calhoun, 2010; Searle et al., 2015; Wilkins et al., 2011). Regarding scale reliability, our internal consistency was excellent (alpha = 0.94).[5]

---

[4] In subsidiary analyses, we ran our main analyses using alternate versions of this deployment-related trauma count scale for the reduced ‘deployed-only’ subsample (e.g. a count of all 26 items, a count of all 9 categories). However, the results did not appreciably differ, regardless of which method was used, consistent with previous research (e.g. Searle, A. K., Van Hooff, M., Lawrence-Wood, E. R., Grace, B. S., Saccone, E. J., Davy, C. P., Lorimer, M. & McFarlane, A. C. (2017). The impact of antecedent trauma exposure and mental health symptoms on the post-deployment mental health of Afghanistan-deployed Australian troops. *J Affect Disord,* 220, 62-71.).

[5] Internal consistency is a measure of scale reliability, indicating the overall strength of association between all scale item pairs—or essentially, how well all items measure the same thing and ‘hang together’ as a unitary construct, with a maximum possible Cronbach’s alpha value of 1.

2.3.3.4 Psychological distress

The Kessler Psychological Distress Scale (K10) (Kessler et al., 2002) was designed to measure non-specific psychological distress, but includes items that represent both depressive and anxiety symptomatology. Participants rate the 10 questions (e.g. 'about how often did you feel worthless') in reference to how they have been feeling over the last four weeks on a five-point Likert scale (ranging from *none of the time* to *all of the time*), and items are summed to produce a total score ranging from 10 to 50, with higher scores indicating higher levels of psychological distress. This Australian scoring system differs from the US system, where each response is scored from 0 to 4, and total scores range from 0 to 40. The K10 is widely used in clinical screening and epidemiological research, shows high factorial validity and internal consistency, and performs at least as well as other relevant questionnaires (Andrews & Slade, 2001; Baillie, 2005; Furukawa et al., 2008; Hides et al., 2007; Kessler et al., 2002; Kessler & Ustun, 2004). Internal consistency was excellent in our sample (alpha = 0.97).

2.3.3.5 Alcohol consumption

The Alcohol Use Disorders Identification Test (AUDIT) (Babor et al., 2001) was used to assess at-risk patterns of drinking. The 10 items assess alcohol consumption, symptoms of dependence and alcohol-related problems (e.g. 'how often do you have a drink containing alcohol', 'how often during the last 12 months have you had a feeling of guilt or remorse after drinking'), typically or in the last 12 months. Total scores range from 0 to 40, with higher scores indicating more problematic alcohol consumption. The AUDIT demonstrates high internal consistency, and factorial convergent and criterion validity (Allen et al., 1997; Degenhardt et al., 2001; Reinert & Allen, 2002). Internal consistency was good in our sample (alpha = 0.85).

2.3.3.6 Anger levels

The nine-item Dimensions of Anger Reaction Scale (DAR-5) (Forbes et al., 2004) assesses anger frequency, intensity, duration, and anger's perceived negative impact on social relationships, as rated over the past four weeks. Items (e.g. 'when I got angry, I stayed angry') are summed to create a total score (range 0 to 36), with higher scores indicating a higher frequency of anger. This scale has been used in Australian Vietnam veterans, and US Afghanistan and Iraq veterans, and shows strong unidimensionality, and high levels of internal consistency and criterion validity (Forbes et al., 2004). Internal consistency was excellent in our sample (alpha = 0.93).

2.3.4 Predictor variables (transition phase)

2.3.4.1 Years since transition

Participants reported which year they transitioned from full-time ADF service (which could have been at any point between their 'military' survey completion in 2010, and their 'transition' survey completion in 2015). This year was subtracted from 2015, and the resulting variable was categorised into 0–2 years and 3+ years. These categories were in accordance with literature suggesting the first two years represents the period during which veterans reconstruct civilian identities, including housing, employment and family arrangements (Metraux et al., 2017). These categories also represented a fairly even distributional split in our data (see Table 1).

2.3.4.2 Length of service

Participants reported how many years and months they had served in the Regular ADF. This information was converted into one continuous 'length of service' variable, with units in years.

2.3.4.3 ADF medical discharge

Participants were asked to indicate their discharge/resignation category, out of 12 listed options (including 'medical discharge', 'compassionate grounds' and 'end of fixed period engagement', as well as 'other'). These response options were based on the current exit survey utilised by the ADF (Shirt, 2012). We dichotomised this variable to indicate 'medical discharge' versus 'all other discharge types'.

2.3.4.4 Lifetime trauma

Participants indicated their lifetime experience of 26 traumatic events, including direct combat, accident/unexpected traumas (e.g. life-threatening accident; major natural disaster), sexual traumas (e.g. rape), and other interpersonal traumas (e.g. unexpectedly seeing a dead body; beaten by a spouse/romantic partner) on a checklist that was adapted from the PTSD module of the Composite International Diagnostic Interview (CIDI) (Haro et al., 2006). Responses were summed ('yes' = 1, 'no' = 0) to create a lifetime trauma count variable (range 0 to 26).

2.3.4.5 Deployment trauma

Participants retrospectively reported trauma they experienced on *any* deployment during their military career using a 12-item questionnaire, which was a shorter version of the 26-item questionnaire developed for the MilHOP (see Section 2.2.3.2), and adapted from the Deployment Risk and Resilience Inventory (King, King et al. 2006), the King's College Gulf War Survey (Unwin et al., 1999) and the Traumatic Stressors Exposure Scale (TSES-R) (Swann & Hodson, 2004). Each trauma (e.g. go on combat patrols/missions or participate in support convoys, handle or see dead bodies) was coded dichotomously (yes/no), and responses were summed to create a count of the number of deployment-related trauma types experienced, which could range from 0 to 12 (see Appendix C for items and groupings).

2.3.4.6 Trouble with the law since transition

Participants were asked three questions regarding their experiences with the law, including whether they had ever been arrested, whether they had ever been convicted of a crime in a court of law, and whether they had ever been sent to prison. For any 'yes' responses, participants were also asked to indicate whether the event occurred prior to entry into the ADF, prior to transition from Regular ADF service, or since transition from Regular ADF service. We created a dichotomous 'trouble with the law since transition' variable, which was scored 'yes' = 1 where participants provided at least one 'yes' response that had occurred following transition (all other response options were coded 0). Items in this section of the survey were sourced from the 2011 Australian Gulf War Veterans' Health Study follow-up (Sim et al., 2015).

2.3.4.7 Becoming 'uncoupled' following transition

Participants responded to the question 'Has your relationship status changed since transition from full-time Regular ADF?'. Those responding 'yes' were asked to indicate the nature of this change, and those that selected any one of the three 'uncoupled' options (i.e. divorced, separated or widowed) were coded as 'uncoupled'. Those that had instead married or started living with a partner, as well as those that had not changed relationship status since transition, were coded as 'not uncoupled'.

2.3.4.8 Unemployment since transition

Participants responded to the question 'Since transitioning from Regular ADF have you had a period of unemployment greater than three months?' (responding 'yes' or 'no').

2.4 Procedure

For both the TWRP and MilHOP studies, ADF personnel were contacted by email and mail to seek participation and provide study materials. Various avenues (emails, letters, military base visits, SMS and telephone calls) were used to follow up non-responders on multiple occasions across the data collection period. Surveys took approximately 60 minutes to complete. Both research studies were approved by relevant ethics committees. The TWRP was approved by the DVA Human Research Ethics Committee (HREC) and Australian Institute of Health and Welfare (AIHW) Ethics Committee (E014/018 and EO 2015/1/163), and mutually recognised by the Directorate Defence Health Research Coordination (HRC), and The University of Adelaide HREC. The MilHOP was approved by the Australian Defence HREC (574-09, 588-07, 488-07), The University of Queensland Behavioural and Social Sciences Ethical Review Committee (200900441), the DVA HREC (E008-026) and The University of Adelaide HREC (H-183-2009, H065-2008, H064-2008). Linkage of the 2010 and 2015 datasets in our study (described in Section 2.1) was approved by the Military and Veterans' Health Research Data Access Committee (MVHRD0035).

2.5 Statistical analyses

Initial descriptive statistics and regressions were conducted in Stata/SE version 15.0 (StataCorp, 2018). A series of logistic regressions modelled associations between the proposed independent variables and recent (12-month) homelessness. These variables were each examined in separate regression models (i.e. multiple distinct models) to assess their total association with homelessness (tested within both bivariate and demographically adjusted models). The effect estimates generated are odds ratios (ORs), which, as the name suggests, are ratios indicating the odds of homelessness in the examined subgroup (e.g. males) relative to the odds in the reference group (e.g. females) (Persoskie & Ferrer, 2017). It is important to note that this measure cannot be interpreted as one of relative risk or likelihood (like a relative risk ratio can), although in instances where the outcome of interest is 'rare' (i.e. below 10%), then ORs tend to closely approximate risk ratios (Greenland & Thomas, 1982; Zhang & Yu, 1998).

Path analysis of our hypothesised model (using only a selection of our independent variables, due mostly to statistical power considerations) was conducted in Mplus version 8 (Muthén et al., 2017). Path analysis allowed us to simultaneously test the effects of multiple mediating pathways (i.e. alcohol consumption, anger, becoming uncoupled, and unemployment) between psychological distress and homelessness. We also modelled the direct effects between all five predictor variables and homelessness (see Figure 2 for all tested paths). Our structural (i.e. non-measurement) model was estimated using weighted least square mean- and variance-adjusted (WLSMV) regression with theta parameterisation (the default for models with binary mediator and outcome variables). We also applied bootstrapping (i.e. repeated sampling with replacement from the full data set) with 5,000 samples to obtain the 95 per cent confidence intervals (CIs) of the direct, indirect and total effects. The path coefficients presented are probit regression coefficients, which can be interpreted as: a 1-unit change on the independent variable being associated with an x-unit change on either the continuous dependent variable or the continuous latent response variable underlying the binary dependent variable (e.g. the underlying propensity to be homeless).

Analyses adjusted for several potential military phase confounders selected *a priori*, consistent with military homelessness research (Tsai and Rosenheck 2015) and our own prior research with the total Transitioned ADF cohort (Van Hooff et al., 2019), age, sex, and rank (Vittinghoff & McCulloch, 2007). We chose only a select few confounder variables due to statistical power considerations for the path analysis (with a homeless n = 84); as it happened, bivariate associations between the majority of demographic variables and homelessness were small and non-significant, suggesting that the inclusion of any additional covariates would not appreciably change regression estimates for the main model variables.

As previously mentioned, our linked sample comprised 2,334 veterans. This sample reduced to 2,331 when considering missing data on the three covariates (age, sex and rank), as these were population-level variables (i.e. taken from Defence records). However, the amount of missing data differed somewhat across each of the model variables. As a result, the n value for each of our logistic regressions varied depending on which independent variable was modelled, being the lowest for the regression including military phase PTSD symptoms (n = 2,100). Although our path model incorporated several of these variables, it was conducted in Mplus using WLSMV estimation methods, where 'missingness' is only a function of the covariates. Thus, the n for our path model was 2,331 (which is the 'final analysis sample' number referred to in Figure 1).

For all inferential analyses, we used a conventional alpha level of $p < 0.05$ to indicate statistical significance of findings.

3 Results

3.2 Initial analyses

3.2.1 Demographic Characteristics

Table 1 presents demographic characteristics of study participants. At the military phase, the sample was aged on average 40.57 years, and was mostly male (84.9%). At the transition phase, the sample comprised members from all ranks (33.20% Commissioned Officers, 54.57% Non-commissioned Officers, and 12.23% Other Ranks) and Services (19.95% Navy, 53.50% Army, and 26.56% Air Force). Upon transition, the sample had served in the ADF for an average of 19.67 years. Most participants were married/partnered (84.38%), post-high school qualified (79.65%), and had been on an operational deployment (84.33%). Just under one in five had been medically discharged (19.67%). Overall, 84 participants (3.6%) had experienced homelessness at some point within the last 12 months.

Compared with the total population of recently transitioned ADF veterans (i.e. the 24,932), the analysis sample was slightly more likely to be female, in the Air Force, Officers, married, and tertiary educated, and slightly less likely to have been medically discharged. The analysis sample was also slightly less likely to have been homeless in the last 12 months and showed a slightly better (i.e. lower) psychological distress score on the K10. Combined, all of these (slight) differences suggest the analysis sample showed a marginally better risk profile than the total transitioned population, and thus demonstrated some degree of response bias. This issue will be discussed in more detail in the Limitations section (Section 4.2)

Table 1: Demographic profile of the study sample, compared with the total Transitioned ADF population

	Total Transitioned ADF population (N = 24,932)	Analysis sample (n = 2,334)	n
Military phase variables			
Age (years), mean (SE)		40.57 (0.23)	2,331
Male %		84.94 (1,980)	2,331
Service			2,331
Navy %		19.99 (466)	
Army %		53.45 (1,246)	
Air Force %		26.56 (619)	
Rank			2,331
Commissioned Officer %		32.82 (765)	
Non-commissioned Officer %		52.72 (1,229)	
Other Ranks %		14.46 (337)	
Married/partnered %		81.62 (1,874)	2,296
Post-high school qualified %		65.35 (1,507)	2,306
Ever deployed		67.36 (1,570)	2,331
Years served in the ADF, mean (SE)		18.60 (0.23)	2,331
Transition phase variables			
Age (years), mean (SE)	37.7 (.15)	45.50 (0.23)	2,325
Male % [a]	86.9 (21,671)	84.94 (1,980)	2,331
Service (upon transition) [a]			2,331
Navy %	22.8 (5,671)	19.95 (465)	
Army %	60.3 (15,038)	53.50 (1,247)	
Air Force %	16.9 (4,223)	26.56 (619)	
Rank (upon transition) [a]			2,331
Commissioned Officer %	16.3 (4,063)	33.20 (774)	
Non-commissioned Officer %	31.6 (7,866)	54.57 (1,272)	
Other Ranks %	52.2 (13,003)	12.23 (285)	
Married/partnered %	74.7 (18,635)	84.38 (1,928)	2,285

Post-high school qualified %	70.2 (17,507)	79.65 (1,832)	2,300
Ever deployed %	80.4 (20,087)	84.33 (1,937)	2,297
Years served in the ADF, mean (SE)	12.45 (0.10)	19.67 (0.23)	2,288
Medically discharged %	20.4 (5,082)	19.10 (435)	2,278
Years since transition %			2,224
0–2	47.2 (11,763)	48.29 (1,074)	
3+	46.5 (11,600)	51.71 (1,150)	
Recently (i.e. last 12 months) homeless %	5.28 (1,317)	3.6 (84)	2,334
Times with no permanent place to live (of those recently homeless) %			84
1		46.43 (39)	
2		20.24 (17)	
3+		17.85 (15)	
Don't know		15.48 (13)	
Psychological distress mean score (SE)	19.9 (0.2)	16.49 (0.1)	2,284

Note: Only transition phase variables were available for the total Transitioned ADF population.
[a] Sex, rank and Service were obtained for the entire Transitioned ADF population from Defence records; all other values are weighted estimates (see Van Hooff, Lawrence-Wood et al. 2018; Van Hooff, Searle et al. 2019).

3.2.2 Predictors of Homelessness

The left-hand sides of Tables 2 and 3 provide model variable descriptive statistics for the military and transition phase predictors of homelessness, respectively. Overall, the sample showed low to mild levels of PTSD symptoms, psychological stress, alcohol problems and anger, which were below conventional cut-off points for referral and potential disorder diagnosis. Just over one-third (39.95%) of the sample had been unemployed for a period of at least three months following transition, with 1 in 15 (7.62%) reporting becoming uncoupled since transition.

Table 2: Military phase independent variables and their associations with recent homelessness amongst the Transitioned ADF

Military phase independent variable	Mean (SE) or % (n)	Analysis n	Association with recent (12-month) homelessness					
			Bivariate			Adjusted [a]		
			OR	95% CI	*p*	OR	95% CI	*p*
PTSD symptoms	26.20 (0.26)	2,100	1.03	1.01, 1.04	< .001	1.03	1.02, 1.05	< .001
Psychological distress	16.48 (0.13)	2,284	1.07	1.04, 1.09	< .001	1.06	1.03, 1.09	< .001
Alcohol consumption	5.95 (0.10)	2,267	1.07	1.03, 1.11	< .01	1.06	1.02, 1.10	< .01
Anger levels	4.54 (0.13)	2,235	1.06	1.03, 1.09	< .001	1.05	1.02, 1.08	< .001
MEAO deployment trauma (ref = 0 trauma types)		2,272						
1–5 trauma types	23.39 (531)		1.58	0.46, 5.44	ns	1.55	0.45, 5.38	ns
6–9 trauma types	8.28 (188)		3.60	1.01, 12.78	< .05	2.79	0.78, 10.02	ns
never MEAO-deployed	62.29 (1,414)		1.55	0.48, 5.04	ns	1.56	0.46, 5.24	ns
Ever deployed *anywhere* (ref = 'no')	67.36 (1,570)	2,331	1.22	0.75, 1.97	ns	1.75	1.04, 2.93	< .05

Note: Each independent variable was included in a separate regression.
[a] Regressions adjusted for the following covariates: age, rank and sex.
ns = not significant.

Table 3: Transition phase independent variables and their associations with recent homelessness amongst the Transitioned ADF

Transition phase independent variable	Mean (SE) or % (n)	Analysis n	Association with recent (12-month) homelessness					
			Bivariate			Adjusted [a]		
			OR	95% CI	*p*	OR	95% CI	*p*
Years since transition (ref = 0–2 years)								
3+ years	51.71 (1,150)	2,226	0.69	0.44, 1.07	ns	0.70	0.45, 1.11	ns
Medically discharged (ref = 'no')	19.10 (435)	2,281	3.64	2.33, 5.68	< .001	3.53	2.23, 5.61	< .001
Years served in the ADF	19.67 (.23)	2,288	0.94	0.91, 0.96	< .001	0.97	0.93, 1.01	ns
Ever deployed *anywhere* (ref = 'no')	84.33 (1,937)	2,300	1.80	0.86, 3.76	ns	2.01	0.95, 4.27	ns
Deployment trauma count score	3.98 (.08)	2,234	1.12	1.06, 1.19	< .001	1.14	1.07, 1.21	< .01
Lifetime trauma count score	3.40 (.07)	2,174	1.12	1.06, 1.19	< .001	1.16	1.09, 1.23	< .001
Trouble with the law since transition (ref = 'no')	1.42 (33)	2,334	6.33	2.54, 15.78	< .001	5.77	2.22, 14.98	< .01
Unemployed more than 3 months since transition (ref = 'no')	39.95 (906)	2,271	3.33	2.09, 5.30	< .001	3.35	2.07, 5.40	< .001
Uncoupled since transition (ref = 'no')	7.62 (171)	2,247	7.89	4.86, 12.81	< .001	7.63	4.63, 12.57	< .001

Note. Each independent variable was included in a separate regression.
[a] Regressions adjusted for the following covariates: age, rank and sex.
ns = not significant.

3.3 Univariate and adjusted logistic regressions

The right-hand sides of Tables 2 and 3 provide crude (bivariate) and covariate-adjusted associations between each independent variable and homelessness (with each independent variable included in a separate regression). As results of the bivariate and adjusted regressions were similar, with only slight attenuation of the independent variable effects following adjustment, we focus our discussion here on the adjusted regression results.

For the military phase variables (Table 2), after covariate adjustment, statistically significant positive associations were seen between homelessness and PTSD symptoms, psychological distress, alcohol consumption, and anger, where a 1-point increase on these scales was associated with a 3–6 per cent higher chance of homelessness. While there was a trend for higher levels of MEAO deployment trauma to be associated with increased odds of homelessness, this association was only statistically significant in the unadjusted regression, where for those experiencing 6–9 trauma types, the odds of experiencing homelessness were 3.60 times larger than the odds for those experiencing no trauma (the reference category)—which reduced to a non-significant OR of 2.79 following adjustment.

For the transition phase variables (Table 3), after covariate adjustment, the odds of experiencing recent homelessness amongst those who had medically discharged were 3.53 times larger than for those with non-medical discharges, which was statistically significant. While each additional year of service in the ADF was associated with slightly lower odds of homelessness (OR = 0.97), this association was only statistically significant in the unadjusted regression. Although having ever deployed (as opposed to never) was associated with higher odds of homelessness (OR = 2.01), there was a reasonable amount of error around this estimate and, as a result, it was not statistically significant. Both deployment trauma and lifetime trauma showed small significant positive associations, where experiencing each additional trauma type was associated with a 14–16 per cent increased chance of homelessness. Trouble with the law, being unemployed and becoming uncoupled all showed large significant positive associations with homelessness, indicating significantly increased odds of homelessness within adjusted regressions (ORs of 5.77, 3.35 and 7.63 respectively).

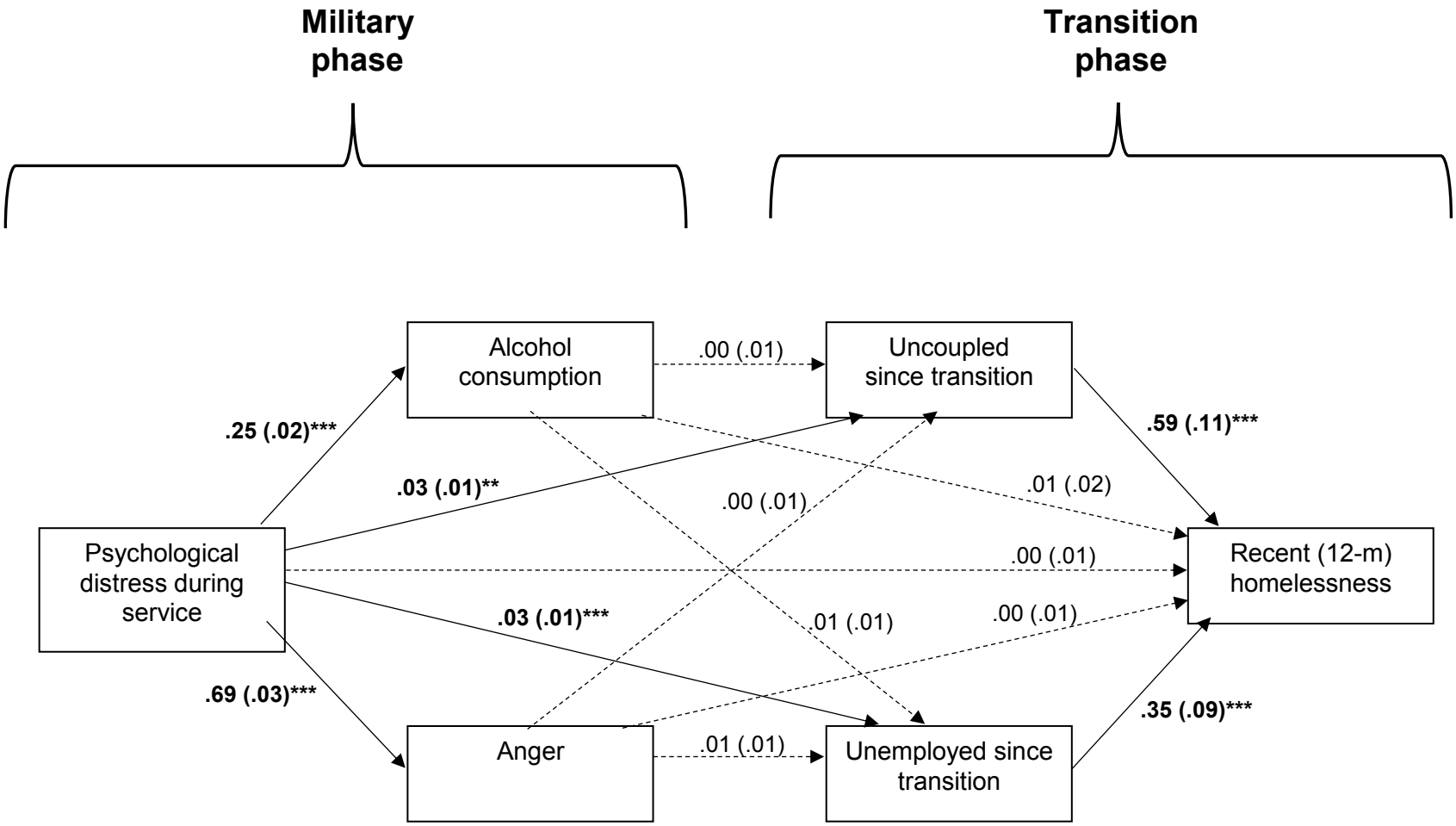
3.4 Path analysis

Our path model tested pathways between the broad constructs of mental health issues (using psychological distress), risk behaviours (using alcohol consumption and anger), structural breakdown following transition (using relationship breakup and job loss/unemployment), and homelessness. For substantive as well as statistical power reasons (i.e. requiring approximately 10 homelessness ‘cases’ for each included independent variable, as per (Vittinghoff & McCulloch, 2007) we did not include all of the variables tested within the above regressions. Specifically, we did not include any variables that did not fit within these pathways (i.e. time since transition, medically discharged, years served at transition, and lifetime trauma). Nor did we include deployment or deployment trauma, given they were not associated with homelessness; PTSD symptoms, given it was highly correlated (r = 0.73) with psychological distress and is not a consistent predictor of veteran homelessness within multi-variable models that include other mental health issues (Tsai and Rosenheck 2015); and trouble with the law since transition, given its extremely low prevalence (1.42%).

Pathways within the model are displayed in Figure 2. Total, direct, and indirect effects for each independent variable on homelessness, and their bootstrapped confidence intervals, are provided in Table 4.

When modelling all the path model variables simultaneously (see Figure 2), only the two post-military variables—becoming 'uncoupled' following transition and being unemployed for at least three months following transition—showed significant direct associations with homelessness. The effect of becoming uncoupled was slightly larger than that for being unemployed. Psychological distress was only significantly associated with homelessness indirectly (in fact, 100% of the total effect for psychological distress was comprised of its indirect effect—see Table 4), through being unemployed, and through becoming uncoupled (which was the larger of the two indirect effects). Although psychological distress showed small to moderate significant associations with both alcohol problems and anger, it was not indirectly associated with homelessness through either of these variables. In fact, neither alcohol consumption nor anger showed *any* (indirect, direct or total) association with homelessness, and showed near-zero associations with being uncoupled or unemployed after adjusting for all other preceding variables.

Figure 2: Path model predicting recent (12-month) homelessness in the Transitioned ADF (n = 2,331)



Note: All tested paths are displayed, with non-significant paths represented by dashed lines. Path coefficients are probit regression coefficients (with standard errors). Covariates (age, rank and sex) were tested but their effects are not displayed.
*** p < .01; *** p < .001.*

Table 4: Path analysis indirect, direct and total effects for recent (12-month) homelessness in the Transitioned ADF (n = 2,331)

	Total effect			Direct effect			Indirect effect		
Exogenous variable	**Effect**	**SE**	**B 95% CI**	**Effect**	**SE**	**B 95% CI**	**Effect**	**SE**	**B 95% CI**
Psychological distress	0.04***	0.01	0.02, 0.06	0.00	0.01	-0.04, 0.04	0.04**	0.01	0.00, 0.08
via uncoupled since transition	-	-	-	-	-	-	*0.02**	*0.01*	*0.00, 0.04*
via unemployed since transition	-	-	-	-	-	-	*0.01**	*0.00*	*0.00, 0.03*
Alcohol consumption	0.02	0.02	-0.03, 0.06	0.01	0.02	-0.03, 0.05	0.00	0.01	-0.02, 0.02
Anger	0.01	0.01	-0.03, 0.04	0.00	0.01	-0.03, 0.04	0.00	0.01	-0.02, 0.02
Uncoupled since transition	0.59***	0.11	0.33, 0.90	0.59***	0.11	0.33, 0.90	-	-	-
Unemployed since transition	0.35***	0.09	0.15, 0.62	0.35***	0.09	0.15, 0.62	-	-	-

Note: Numbers may not add up exactly because of rounding.
B 95% CI = bootstrapped lower and upper 95% confidence intervals.
All associations were adjusted for the following covariates: age, rank and sex, as well as each of the independent (i.e. exogenous) variables. Along with the overall indirect effects for each exogenous variable, the two specific indirect pathways that were statistically significant (out of a possible 12 tested) are presented here.
** p < .05; ** p < .01; *** p < .001.*

4 Discussion

This study is one of the first to examine multiple psychosocial and structural mechanisms of homelessness amongst recently transitioned veterans in the post-9/11 era. Overall, results showed that there were multiple predictors of homelessness across pre-military, military and transition time periods, supporting the assertion that homelessness is multifactorial (Rosenheck & Fontana, 1994; Tsai & Rosenheck, 2015). However, only becoming uncoupled since transition and experiencing unemployment since transition were directly associated with homelessness within the path model, with psychological distress during military service showing an indirect effect through these variables. These results will now be discussed in detail.

Results were consistent with international literature on the predictors and correlates of veteran homelessness (Balshem et al., 2011; Tsai & Rosenheck, 2015). Almost all of the independent variables we examined showed significant covariate-adjusted associations with homelessness. These included: lifetime trauma (reported in 2015 but reaching back as far as childhood); PTSD symptoms, psychological distress, anger, and alcohol problems during the military; medically discharging, time since transitioning, trouble with the law following transition, becoming uncoupled following transition, and being unemployed following transition. These associations persisted even after adjusting for several relevant covariates. Some of these effect sizes could be considered fairly large, and thus represent promising points for intervention. It is interesting that we found similar associations to those from US studies, given the differing social contexts between the two countries. For example, Australia has a high level of median wealth and a good social welfare system (including Medicare), which effectively act as social safety nets for issues like homelessness. Yet veterans' entitlements are not nearly as accessible or widespread as they are in the US. Thus, the combination of these two opposing effects might result in little contextual effect *overall*. Such cultural differences are unable to be explored in this current study, and must be left at speculation. Alongside these various individual-level risk and protective factors, the social context in which homelessness occurs is also important to consider.

Using a reduced sample of recently transitioned ADF veterans (i.e. those who could be linked to military phase data), our results support the cross-sectional findings generated for the entire population of transitioned ADF personnel (i.e. N = 24,932) using sample weighting (Van Hooff et al., 2019). As with our findings, the cross-sectional report highlighted that homelessness was associated with a constellation of negative factors, including unemployment, financial strain, lower social support, and elevated levels of various mental health symptoms. That the broad pattern of results did not differ across reports is reassuring, suggesting that results from our sample may be reasonably representative of the total population.

However, this current report provides a more complex understanding of veteran homelessness, for several reasons. First, adjusting all results for multiple covariates, as well as including multiple variables simultaneously in the one path model, increases the rigor of findings as they are less likely to be due to the presence of these potential confounders. Nonetheless, our adjusted results did not appreciably differ from our unadjusted results, and they were broadly comparable to the previous report's unadjusted results, suggesting that the demographic variables we included did not have much confounding influence. Second, unlike the previous report, we were able to include several military phase variables, collected four years prior to becoming homeless (as per our measure of homelessness). Thus, we could demonstrate temporal precedence for the associations between homelessness and PTSD symptoms, psychological distress, alcohol consumption and anger, as well as deployment experiences. In this manner, these variables could be referred to as 'risk factors' in this current report, rather than simply 'correlates'. Third, this current report extended the previous report's simple bivariate associations to examine the mechanisms by which several of these variables were associated with homelessness. This higher degree of detail may help service providers to determine which variables might be best prioritised within interventions. Together, the complementary analyses

within these two reports have identified population-level correlates, as well as longitudinal mechanisms, of homelessness.

The small and often non-significant associations between homelessness and both deployment and deployment trauma exposure were not necessarily surprising. The lack of deployment effect is quite consistent with Australian findings for various health outcomes amongst deployed military personnel (McFarlane et al., 2011) and aligns with several international studies regarding post-9/11 deployment (Fear et al., 2010; Hotopf et al., 2006; Jones et al., 2013). However, research regarding deployment effects is equivocal overall, with a number of studies demonstrating significant effects (Hotopf et al., 2006; Milliken et al., 2007), including a significantly higher prevalence of some affective and anxiety disorders amongst deployed veterans in the ADF transitioned population that our sample as taken from Van Hooff, Lawrence-Wood et al. (2018).These disparate findings have been discussed at length (Kok et al., 2012; Sundin et al., 2010; Sundin et al., 2014), and appear to be partially related to various deployment-related differences between samples (in particular, the degree of traumatic deployment exposure experienced). Amongst the studies finding no deployment effect, those deployed are often quite heterogeneous regarding various aspects of their deployment (such as trauma exposure, location, role and duration). Moreover, the 'healthy warrior effect' (Haley, 1998), whereby those selected to deploy are the most physically and psychologically able, has also been documented between deployed and non-deployed groups; in fact, non-deployed personnel are more likely to be female, single, younger, and in worse health at pre-deployment, all of which are statistically associated with poorer health outcomes (Jones et al., 2013; Searle et al., 2013). There were deployment effects for some mental health outcomes in the broader population of transitioned veterans (Van Hooff et al., 2018), which may speak to differences between the total Transitioned ADF population and our sample (which we discuss later), or simply to less association between deployment and homelessness than deployment and mental health.

While we demonstrated an overall weak trend for deployment trauma, this was only significant bivariately, and not following covariate adjustment (thus we did not include it in our path model). This is consistent with the few studies that have actually examined associations between homelessness and deployment trauma (with most instead focussing on simply having deployed), where deployment trauma showed bivariate but generally not adjusted associations with homelessness (Elbogen et al., 2013; Rosenheck & Fontana, 1994). Within their homelessness path model, Rosenheck and Fontana (1994) only found indirect pathways for deployment trauma through psychiatric disorder, substance abuse, low social support and being unmarried. Tsai and Rosenheck (2015) speculated that, in the US, this weak deployment trauma effect may be partly due to access to relevant Veterans Affairs services, which may interrupt the pathway to homelessness. Whether this would also be plausible in the Australian context is unclear given the multiple contextual differences between the two countries, including reduced access to veterans' entitlements but greater public health access for Australian veterans.

The only other (apparent) model that has assessed multiple pathways to veteran homelessness (Rosenheck & Fontana, 1994) was different from ours in many respects, making direct comparison difficult. For instance, that study's sample comprised Vietnam veterans, and homelessness could refer to any point in the lifetime. Moreover, all variables between this model and ours were different to some degree (even similar constructs were generally operationalised differently, or measured at a different time period). Despite this, our results share some broad commonalities. Like us, Rosenheck and Fontana found that almost all of their multiple independent variables (across pre-military, military and transition periods) were bivariately associated with homelessness, but fewer direct effects were seen within their path model. More specifically, psychiatric disorder, substance abuse and being unmarried (which closely resembled three of our variables) were bivariately associated with homelessness, and were also the key variables through which multiple indirect pathways to homelessness ran. Compared with these variables, only becoming uncoupled following transition was directly associated with homelessness within our path model (along with being unemployed, which

Rosenheck and Fontana did not study). As Rosenheck and Fontana assessed substance abuse and psychiatric *disorder diagnoses,* perhaps such 'extreme' manifestations of problems are more strongly related to homelessness than the continuous symptom scales that we used. Additionally, we included becoming unemployed in our model, which reduced some of the direct effect of psychological distress, and may have helped to render the unique effect of alcohol consumption non-significant.

Our results sit well against the broad conclusions drawn from qualitative studies of pathways to veteran homelessness, where mental health issues were thought to precipitate difficulties in intimate relationships and in obtaining/maintaining employment, which were the proximal structural issues that led to homelessness (Hamilton et al., 2011; Metraux et al., 2017). Moreover, the pathways in our quantitative model align with themes that naturally emerged amongst the narratives of homeless veterans in the qualitative interviews (see Hilferty, Katz 2019a), providing indirect support for the *directionality* of our model. This is important given that we could not empirically confirm directionality, as not all pathways were longitudinal (discussed later as a limitation). Together, our studies point to the complex and multifactorial nature of homelessness, and the multiple pathways that may precipitate it.

4.2 Limitations

The results presented in this report must be considered in light of several limitations. First, given we only had two waves of data, but six model variables, not all variables could be temporally sequenced. In particular, the two variables showing direct associations (becoming uncoupled and becoming unemployed following transition) were assessed at the same time as homelessness. Given 'homelessness' referred to some point within the previous 12 months, and becoming uncoupled/unemployed referred to any point since transition (which could have been between 0 and 5 years prior to survey completion), it is possible that becoming uncoupled and/or unemployed could have occurred prior to, at the same time as, or even after homelessness across our sample. Unfortunately, the nature of the survey wording for these three variables was too broad to determine the exact temporal order. Thus, we cannot attempt to claim cause-and-effect relationships between homelessness and these variables (nor with the other variables assessed at the transition phase), and these factors must be considered as correlates rather than true risk factors.

Our significant correlational findings should be explored more thoroughly in future research using longitudinal data. It is likely that the variables assessed were related in a more complex and cyclical fashion than we were able to test here: for example, psychological distress, anger and alcohol may have *precipitated* structural breakdown (becoming uncoupled and/or being unemployed), but equally, this breakdown may have been *followed* by an increase in distress and anger, and increased alcohol consumption as a means of coping. These cycles are evident in veterans' narratives (Hamilton, Poza et al. 2011) and may perpetuate homelessness, or lead to it reoccurring (McQuistion, Gorroochurn et al. 2014).

Second, due to homelessness being a relatively low-prevalence condition, only 84 veterans who completed a survey had experienced recent (12-month) homelessness. While our path model was adequately powered according to standard rules of thumb for binary outcome models (Vittinghoff & McCulloch, 2007), the low cases of homelessness prevented us from including other potentially relevant variables. Regardless, our model was able to demonstrate several indirect mechanisms related to homelessness, and thus identify several factors that could be targeted through intervention. Thus, it represents a valuable starting point for further research, especially as it appears to be only the second multifactorial longitudinal model of veteran homelessness (the first being Rosenheck and Fontana 1994). Future research could build on these two models of homelessness by introducing additional variables that are relevant to homelessness, such as other risk behaviours (e.g. gambling, trouble with the law) and employment/financial variables (e.g. money mismanagement) (Elbogen et al., 2013; Harris et al., 2017; Tsai & Rosenheck, 2015). Additionally, with thoughtful longitudinal design, studies could include the same variables at multiple time points (in particular, mental health variables

across pre-military, military and transition periods) in order to identify important periods for intervention. Moreover, moderators of these pathways could be considered. One possibility is that the associations between job loss/unemployment and relationship breakdown and homelessness may be weaker for veterans who have the financial resources available to deal with these issues. That is, veterans with savings or with family members who are wealthy may have the resources to obtain housing when such structural disruption occurs—in line with Hobfoll's Conservation of Resources theory (Hobfoll, 1989). Various contextual factors such as this may modify the impact of the risk factors we identified.

Third, certain relevant aspects of veterans' broader homelessness experience could not be ascertained due to the definition of 'recent (12-month)' homelessness utilised in this study. For instance, the homelessness we identified in our veterans may not have been their first episode of homelessness—either in their lifetime, or even since leaving full-time military service. Just under half of our veterans who had experienced recent (12-month) homelessness indicated they had only experienced one episode of homelessness. Unfortunately, the nature of our data only allowed us to examine the most recent episode of homelessness, and our sample size was too small to examine pathways amongst first-time and repeatedly homeless veterans separately. Thus, it is not clear whether the pathways we identified speak more to the *incidence* of homelessness, or instead to more complex and chronic cycles. Previous experience of homelessness is known to be a risk factor for future homelessness in both civilian and veteran samples, and there is some evidence to suggest that homelessness prior to military service is related to homelessness following transition (Hamilton et al., 2011; Lipton et al., 2000; McQuistion et al., 2014; O'Connell et al., 2008). Thus, it may be prudent for military forces to consider assessing past homelessness amongst personnel as an indicator of vulnerability upon transition and offer assistance accordingly.

The definition of homelessness we utilised also does not consider those who were not homeless in the last 12 months but *had* been homeless at some point prior (another 270 veterans). While it is important to understand pathways to *all* cases of veteran homelessness, we chose this more limited focus given it was most likely to have occurred following transition from military service, and as it allowed us to temporally sequence other model variables as occurring theoretically prior.

Fourth, our data did not have the precision to determine when recent homelessness had occurred in relation to military service (prior to, during or after) and, importantly, in relation to transition (prior to or after). One would imagine that the majority of recent homelessness (i.e. in the last 12 months) was following transition, given that: (1) due to its recency, it would have overwhelmingly occurred during or following (and not prior to) military service; and (2) homelessness during military service is uncommon, with recent homelessness prevalence in the currently serving ADF being low (1.5%—see Van Hooff, Searle et al. 2019). However, we had no way of confirming this. Accordingly, further research would do well to capture veterans' homelessness experience in greater detail.

Finally, our sample cannot be considered to be representative of the broader contemporary veteran population (which we estimated to total just under 30,000). In our sample, it appeared that males, lower ranks, and those who were less educated, unpartnered and medically discharged were slightly underrepresented when compared with weighted estimates for the entire Transitioned ADF population. Moreover, it appeared that our sample had slightly lower levels of psychological distress during the military phase, and a slightly lower likelihood of experiencing recent homelessness, compared with weighted estimates. Whether our regression and path model results would differ if applied to all transitioned veterans remains to be seen, and thus it cannot be assumed that our results can be generalised to all contemporary veterans.

As such, our results must be interpreted in light of the group that they represent. Unfortunately, the recruitment and sample bias difficulties encountered are inherent to veteran research (see (Harvey et al., 2011; McFarlane et al., 2011) and also within homelessness research (Balshem et al., 2011; Tsai & Rosenheck, 2015)., where homeless people are difficult to recruit within community samples given their potentially chaotic lifestyles and thus more limited and unreliable

contact details. Relatedly, our results may have underrepresented certain types of homeless veterans: for example, veterans sleeping on the streets may have been less able to maintain mobile phone numbers and email addresses, and thus not be contactable for participation. Again, this was largely unavoidable and inherent in studying such a complex population.

4.3 Implications for policy and practice

These results have several important implications for how ADF members are supported around the transition period. The various pathways to homelessness we identified, involving psychological distress, relationship breakdown, and unemployment, may provide a useful point for identification of, and potential intervention with, at-risk veterans.

First, our results indicated that intervention efforts could be employed during veterans' military service periods, allowing both the ADF and DVA an opportunity to act early, before any existing risk factors worsen and give rise to other more proximal risk factors of homelessness following transition. Specifically, providing intervention for ADF members who have experienced psychological distress during military service (captured here within five years of transition), before they leave Regular service (i.e. pre-transition), could be considered a cost-effective option, given that reducing mental health issues may reduce not only instances of homelessness, but also multiple related and precipitating problems following transition that would need addressing in order to prevent homelessness from re/occurring. As there is evidence that mental health issues in veterans may compound over time, including across the transition period (Bryant et al., 2018; Eekhout et al., 2016; Goodwin et al., 2012; Reijnen et al., 2015; Thomas, 2010), any identified issues clearly need attention before they become entrenched and harder to treat. The ADF is well-placed to do this, given the organisation already conducts Periodic Health Examinations (PHEs), which include mental health screening (using the K10, amongst other measures) and lifestyle counselling for those with identified mental health risk factors. This screening is conducted at least every five years, and currently the ADF is in the process of trialling increased frequency screening schedules.

Although alcohol consumption and anger were neither directly nor indirectly related to homelessness within our path model, this does not negate their importance. Their bivariate associations with homeless were not small; however, it is likely that they shared variance with other model variables, rendering their unique effects non-significant. Alcohol and anger issues, along with PTSD symptoms, are often comorbid with psychological distress (Kessler et al., 2003; Teesson et al., 2009; Van Hooff et al., 2018), which was bi-variately associated with homelessness here, and highly correlated and potentially multicollinear with depression in our data. All of these mental health constructs potentially indicate a broader underlying continuum of distress. Thus, clinicians should assess for various forms of mental health issues amongst those with psychological distress, and treat them accordingly, assuming that distress may lead to adverse outcomes. In doing this, it would be critically important for veterans with identified mental health needs to discharge with either civilian or DVA care plans (whichever is appropriate). The transition period has been documented as particularly hard for those with mental health issues (Sheilds, Kuhl et al. 2016), and without existing help, as well as continuity of care across this period, these veterans may 'fall through the cracks'. Ultimately, better mental health interventions during military service may help veterans to rebuild their identities and negotiate associated challenges regarding employment and family dynamics as they rejoin the civilian world. It is also worth noting that mental health and substance use issues are often documented amongst homeless veterans (McQuistion, Gorroochurn et al. 2014), potentially resulting from (or being exacerbated by) the homelessness experience. Accordingly, services for homeless veterans would do well to consider their mental health and substance use issues and needs.

Military forces could also act on the identified transition risk factors of relationship breakdown and unemployment during the period when members are preparing to leave the ADF. It is a common theme within transition literature—including studies of homelessness—that many veterans feel ill-prepared for returning to civilian life and, in particular, renegotiating family

dynamics, maintaining employment, and managing finances (Elbogen et al., 2013; Metraux et al., 2017). In fact, this was repeatedly mentioned amongst homeless veterans within the qualitative component of this Inquiry (Hilferty, Katz et al. 2019a). Thus, this pre-transition period represents an opportunity to educate ADF members on the support services available—or perhaps more importantly, where to find them—should they ever need them post-transition. Providing support around relationships (including support for partners) and employment pathways, especially for those with elevated psychological distress, may help to interrupt the complex and multifaceted cycles associated with homelessness.

While relationship breakdown and unemployment may plausibly have been causes or consequences of homelessness for our study sample (though this could not be confirmed with our cross-sectional data), they still present an opportunity to: (1) develop a potential risk profile for ADF members who may need more support over the transition period; and (2) ensure that homelessness services are multifactorial and able to address complex health and wellbeing concerns, and not just a lack of housing. If these risk factors do influence homelessness in a cyclical manner, then providing the veteran with a house/accommodation may not address the root cause of homelessness, and it may reoccur. Given we assessed these factors as occurring following transition, it may be helpful for the DVA to engage in some level of universal contact/monitoring for veterans, as these events will not yet have occurred (and any precipitating factors may not yet have become visible) during military service.

4.4 Conclusion

This analysis confirms the multifactorial nature of homelessness, with various predictors across several time periods. Prevention strategies and responses to homelessness should therefore address the range of risk factors that can lead to homelessness. The findings in this report highlight the multiple time points at which the ADF, DVA and various other government and non-government agencies could intervene to prevent homelessness. However, the pathways identified here suggest that working to reduce psychological distress (and related mental illness), and its negative associations with maintaining relationships and jobs following transition, may have the most success.

Appendix A: Glossary of terms

Australian Bureau of Statistics (ABS) – The ABS is Australia's national statistical agency, providing trusted official statistics on a wide range of economic, social, population and environmental matters of importance to Australia.

Australian Defence Force (ADF) – The ADF is constituted under the Defence Act 1903, its mission is to defend Australia and its national interests. In fulfilling this mission, Defence serves the government of the day and is accountable to the Commonwealth Parliament, which represents the Australian people to efficiently and effectively carry out the government's defence policy. The current program of research aims to examine the mental, physical and social health of serving and ex-serving ADF members, and their families. It builds upon previous research to inform effective and evidence-based health service provision for contemporary ADF members and veterans.

Centre for Traumatic Stress Studies (CTSS) – The CTSS seeks to improve evidence-based practice by informing and applying scientific knowledge in the field of trauma, mental disorder and wellbeing in at-risk populations. The current program of research was conducted by a consortium of Australia's leading research institutions, led by the CTSS at the University of Adelaide and the Australian Institute of Family Studies (AIFS).

Confidence interval (CI) – A confidence interval gives an estimated range of values that is likely to include an unknown population parameter, the estimated range being calculated from a given set of sample data.

Department of Veterans' Affairs (DVA) – The DVA delivers government programs for war veterans, members of the ADF, members of the Australian Federal Police and their dependents. In 2014 the DVA, in collaboration with the Department of Defence, commissioned the Transition and Wellbeing Research Programme—one of the largest and most comprehensive military research programs undertaken in Australia.

Homelessness – Until recently, the most widely accepted definition of 'homelessness' was that developed by Chamberlain and MacKenzie (Chamberlain & MacKenzie, 1992; Chamberlain & MacKenzie, 2008). This definition was based on cultural expectations of the degree to which housing needs were met within conventional expectations or community standards. In Australia this meant having, at a minimum, one room to sleep in, one room to live in, one's own bathroom and kitchen, and security of tenure.

This definition describes three types of homelessness:

- *primary*—rough sleeping
- *secondary*—temporary accommodation (includes people moving frequently from one form of temporary accommodation to another, such as emergency housing, boarding houses or staying with family or friends/couch surfing)
- *tertiary*—inappropriate housing (refers to people staying for longer than 13 weeks in rooming houses or equivalent temporary accommodation).

In 2012 the ABS developed a new definition of homelessness, informed by an understanding that homelessness is not 'rooflessness' (ABS 2012b). A person is considered homeless under this revised definition if their current living arrangement exhibits one of the following characteristics:

- is in a dwelling that is inadequate
- has no tenure or the initial tenure is short and not extendable
- does not allow them to: have control of and access to space for social relations; provide a sense of security, stability, privacy or safety; or provide the ability to control living space.

It is notable that the 2012 ABS definition includes people in severely overcrowded dwellings who are considered not to have control of or access to space for social relations.

Indigenous understandings and definitions of homelessness can differ from those described above and can include 'spiritual homelessness' (the state of being disconnected from one's homeland, separation from family or kinship networks, or not being familiar with one's heritage); and 'public place dwelling' or 'itinerancy' (usually used to refer to Indigenous people from remote communities who are 'sleeping rough' in proximity to a major centre) (Australian Bureau of Statistics, 2014; Australian Institute of Health and Welfare, 2014; Memmott et al., 2003).

Indigenous homelessness is not necessarily defined as a lack of accommodation. It can be defined as losing one's sense of control over or legitimacy in the place where one lives (Memmott, Long et al. 2003), or an inability to access appropriate housing that caters to an individual's particular social and cultural needs (Birdsall-Jones et al., 2010). Some public space dwellers who have chosen to live rough may not see themselves as homeless (Memmott et al., 2003).

Middle East Area of Operations (MEAO) – Australia's military involvement in Afghanistan and Iraq is often referred to as the Middle East Area of Operations (MEAO). Thousands of members have deployed to the MEAO since 2001, with many completing multiple tours of duty.

Military Health Outcomes Program (MilHOP) – MilHOP detailed the prevalence of mental disorder in current serving ADF members in 2010, as well as deployment-related health issues for those deployed to the MEAO.

National Death Index (NDI) – The NDI is a Commonwealth database that contains records of deaths registered in Australia since 1980. Data comes from Registrars of Births, Deaths and Marriages in each jurisdiction, the National Coronial Information System and the ABS. Prior to contacting participants, the 'study roll' for this research was cross-checked against the NDI to ensure that we did not approach deceased members.

Post-traumatic stress disorder (PTSD) – A stress reaction to an exceptionally threatening or traumatic event that would cause pervasive distress in almost anyone. Symptoms are categorised into three groups: re-experiencing symptoms such as memories or flashbacks; avoidance symptoms; and either hyperarousal symptoms (increased arousal and sensitivity to cues) or inability to recall important parts of the experience.

Rank status – Three levels of rank were utilised in the Mental Health and Wellbeing Transition Study:

- *Commissioned Officer* (OFFR)—consists of senior Commissioned Officers (Commander (CMDR), Lieutenant Colonel (LTCOL), Wing Commander (WGCDR) and above) and Commissioned Officers (Lieutenant Commander (LCDR), Major (MAJ), Squadron Leader (SQNLDR) and below).
- *Non-commissioned Officer* (NCO)—consists of senior Non-commissioned Officers (Petty Officer (PO), Sergeant (SGT) and above) and junior Non-commissioned Officers (Leading Seaman (LS), Corporal (CPL) and below).
- *Other Ranks*—consists of Able Seaman (AB), Seaman (SMN), Private (PTE), Leading Aircraftman (LAC), Aircraftman (AC) or equivalent.

Service status – The ADF is comprised of the following three Services.

- *Australian Army*—the army is Australia's military land force. It is a potent, versatile and modern army which contributes to the security of Australia, protecting its interests and people.
- *Royal Australian Navy*—the navy provides maritime forces that contribute to the ADF's capacity to defend Australia, contribute to regional security, support global interests, shape the strategic environment and protect national interests.

- *Royal Australian Air Force*—the air force provides immediate and responsive military options across the spectrum of operations as part of a whole-of-government joint or coalition response, either from Australia or deployed overseas. They do this through the key air power roles: control of the air; precision strike; intelligence, surveillance and response; and air mobility—enabled by combat and operational support.

Appendix B: Acronyms

ABS	Australian Bureau of Statistics
ADF	Australian Defence Force
AHURI	Australian Housing and Urban Research Institute
CI	Confidence interval
DVA	Department of Veterans' Affairs
HREC	Human Research Ethics Committee
K10	Kessler Psychological Distress Scale
MEAO	Middle East Area of Operations
MilHOP	Military Health Outcomes Program
OR	Odds ratio
PCL-C	Post-traumatic Stress Disorder (PTSD) Checklist—civilian version
PHE	Periodic Health Examination
PTSD	Post-traumatic stress disorder
SE	Standard error
TWRP	Transition and Wellbeing Research Programme
US	United States

Appendix C: Supplementary table

Table A1: The deployment-related trauma items (and respective 'trauma exposure' categories) from the military phase and transition phase surveys

Trauma category	Military phase (i.e. MilHOP) items, relating to MEAO deployment	Transition phase (i.e. TWRP) items, relating to any deployment
Potential for exposure	Seriously fear you would encounter an IED Go on combat patrols or missions Participate in support convoys (e.g. re-supply, VIP escort) Concerned about yourself or others (including allies) having an unauthorised discharge of a weapon Clear/search buildings Clear/search caves	Seriously fear you would encounter an IED Go on combat patrols/missions or participate in support convoys Concerned about yourself or others (including allies) having an unauthorised discharge of a weapon Clear/search buildings, caves, vessel, etc.
Coming under fire	Come under small arms or anti-aircraft fire Come under guided or directed mortar/artillery fire Experience indirect fire (e.g. rocket attack) Experience an IED/IOD that detonated Experience a suicide bombing Experience a landmine strike Encounter small arms fire from an unknown enemy combatant	Come under fire (i.e. small arms or anti-aircraft fire, guided or directed mortar/artillery fire or missile attack, indirect fire (e.g. rocket attack), IED/EOD detonation, suicide bombing, landmine strike, small arms fire from an unknown enemy combatant
In danger of being injured or killed	In danger of being killed In danger of being injured	In danger of being killed or injured
Casualties among people close to you	Heard of a close friend or co-worker who had been injured or killed Were present when a close friend was injured or killed	Have casualties amongst people close to you (i.e. were present or heard of a close friend, co-worker or loved one who had been injured or killed)

	Heard of a loved one who was injured or killed Were present when a loved one was injured or killed	
Handling/seeing dead bodies	Handled dead bodies Saw dead bodies	Handle or see dead bodies
Threatening situation, unable to respond	Experience a threatening situation where you were unable to respond due to the rules of engagement	Experience a threatening situation where you were unable to respond due to the rules of engagement
Witness to human degradation/misery	Witness to human degradation and misery on a large scale	Witness human degradation and misery on a large scale
Discharging own weapon	Discharge your own weapon in direct combat	Discharge your weapon in direct combat
Own action/inaction result in injury or death	Believe your own action or inaction resulted in someone being seriously injured Believe your own action or inaction resulted in someone being killed	Believe your action or inaction resulted in someone being seriously injured or killed

Source*:* Adapted from the Census Study Report (Dobson et al., 2012).

References

ABS—see Australian Bureau of Statistics

AIHW—see Australian Institute of Health and Welfare

Allen, J. P., Litten, R. Z., Fertig, J. B. & Babor, T. F. (1997). A review of research on the Alcohol Use Disorders Identification Test (AUDIT). *Journal of Alcoholism Clinical Experimental Research,* 21(4), 613-619.

Andrews, G. & Slade, T. (2001). Interpreting scores on the Kessler Psychological Distress Scale (K10). *Australian and New Zealand Journal of Public Health,* 25(6), 494-497.

Australian Bureau of Statistics. (2011). *General Social Survey-Summary Results* [Online]. Cat. 4159.0. Canberra: Australian Bureau of Statistics. Available: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4159.02010 [Accessed September 2017].

Australian Bureau of Statistics. (2012). *4922.0 Information Paper - A Statistical Definition of Homelessness* [Online]. Cat no. 4922.0 Canberra: Australian Bureau of Statistics. Available: http://www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/4922.0Main%20Features22012?opendocument&tabn

Australian Bureau of Statistics (2014). *Information paper: Aboriginal and Torres Strait Islander peoples perspectives on homelessness*: cat. no. 4736.0, ABS, Canberra.

Australian Institute of Health and Welfare (2014). *Homelessness among Indigenous Australians,* AIHW, Canberra.

Babor, T. F., Higgins-Biddle, J., Saunders, J. B. & Monteiro, M. (2001). *The Alcohol Use Disorders Identification Test (AUDIT): Guidelines for use in primary care.,* Geneva: World Health Organization, Department of Mental Health and Substance Dependence.

Baillie, A. J. (2005). Predictive gender and education bias in Kessler's psychological distress Scale (k10). *Social Psychiatry and Psychiatric Epidemiology,* 40(9), 743-748.

Balshem, H., Christensen, V., Tuepker, A. & Kansagara, D. (2011). *A Critical Review of the Literature Regarding Homelessness Among Veterans* [Online]. VA-ESP Project # 05-225: 2011. Available: http://www.hsrd.research.va.gov/publications/esp/homelessness-REPORT.pdf

Bergman, B. P., Burdett, H. J. & Greenberg, N. (2014). Service Life and Beyond – Institution or Culture? *The RUSI Journal,* 159(5), 60-68.

Birdsall-Jones, C., Corunna, V., Turner, N., Smart, G. & Shaw, W. (2010). *Indigenous homelessness* [Online]. AHURI Final Report No. 143, Australian Housing and Urban Research Institute, Melbourne. Available: http://www.ahuri.edu.au/publications/projects/p80368.

Bryant, R., Lawrence-Wood, E., Baur, J., McFarlane, A., Hodson S, Sadler, N., Benassi, H., Howell, S., Abraham, M., Iannos, M., Hansen, C., Searle, A. & Van Hooff, M. (2018). *Mental Health Changes Over Time, A Longitudinal Perspective: Mental Health and Wellbeing Study,* the Department of Defence and the Department of Veterans' Affairs, Canberra.

Burdett, H., Woodhead, C., Iversen, A. C., Wessely, S., Dandeker, C. & Fear, N. T. (2013). "Are You a Veteran?" Understanding of the Term "Veteran" among UK Ex-Service Personnel: A Research Note. *Armed Forces & Society,* 39(4), 751-759.

Castro, C. A. & Kintzle, S. (2014). Suicides in the military: the post-modern combat veteran and the Hemingway effect. *Curr Psychiatry Rep,* 16(8), 460.
Chamberlain, C. & MacKenzie, D. (1992). Understanding contemporary homelessness: issues of definition and meaning. *Australian Journal of Social Issues,* 27(4), 274-297.
Chamberlain, C. & MacKenzie, D. (2008). *Australian census analytic program: counting the homeless 2006,* cat. no. 2050.0, ABS, Canberra.
Davy, C., Dobson, A., Lawrence-Wood, E., Lorimer, M., Moores, K., Lawrence, A., Horsley, K., Crockett, A. & McFarlane, A. (2012). *The Middle East Area of Operations (MEAO) Health Study: Prospective Study Report.,* Adelaide, Australia: University of Adelaide, Centre for Military and Veterans Health.
Degenhardt, L. J., Conigrave, K. M., Wutzke, S. E., Saunders, J. B. J. D. & Review, A. (2001). The validity of an Australian modification of the AUDIT questionnaire. 20(2), 143-154.
Demers, A. (2011). When veterans return: The role of community in reintegration. *Journal of Loss and Trauma,* 16(2), 160-179.
Dobson, A., Treloar, S., Zheng, W., Anderson, R., Bredhauer, K., Kanesarajah, J., Loos, C., Passmore, K. & Waller, M. (2012). *The Middle East Area of Operations (MEAO) Health Study: Census Study Report,* Brisbane, Australia: The University of Queensland, Centre for Military and Veterans Health.
Eekhout, I., Reijnen, A., Vermetten, E. & Geuze, E. (2016). Post-traumatic stress symptoms 5 years after military deployment to Afghanistan: an observational cohort study. *Lancet Psychiatry,* 3(1), 58-64.
Elbogen, E. B., Sullivan, C. P., Wolfe, J., Wagner, H. R. & Beckham, J. C. (2013). Homelessness and money mismanagement in Iraq and Afghanistan veterans. *Am J Public Health,* 103 Suppl 2, S248-54.
Fargo, J., Metraux, S., Byrne, T., Munley, E., Montgomery, A. E., Jones, H., Sheldon, G., Kane, V. & Culhane, D. (2012). Prevalence and Risk of Homelessness Among US Veterans. *Preventing Chronic Disease,* 9, E45.
Fear, N. T., Jones, M., Murphy, D., Hull, L., Iversen, A. C., Coker, B., Machell, L., Sundin, J., Woodhead, C., Jones, N., Greenberg, N., Landau, S., Dandeker, C., Rona, R. J., Hotopf, M. & Wessely, S. (2010). What are the consequences of deployment to Iraq and Afghanistan on the mental health of the UK armed forces? *Lancet,* 375, 1783-1797.
Forbes, D., Hawthorne, G., Elliott, P., McHugh, T., Biddle, D., Creamer, M. & Novaco, R. W. (2004). A concise measure of anger in combat-related posttraumatic stress disorder. *Journal of Traumatic Stress,* 17(3), 249-256.
Foreign Affairs Defence and Trade Committee Department of the Senate (2016). *Mental health of Australian Defence Force Members and Veterans,* Canberra: Commonwealth of Australia.
Furukawa, T. A., Kawakami, N., Saitoh, M., Ono, Y., Nakane, Y., Nakamura, Y., Tachimori, H., Iwata, N., Uda, H. & Nakane, H. (2008). The performance of the Japanese version of the K6 and K10 in the World Mental Health Survey Japan. *International Journal of Methods in Psychiatric Research,* 17(3), 152-158.
Goodwin, L., Jones, M., Rona, R. J., Sundin, J., Wessely, S. & Fear, N. T. (2012). Prevalence of delayed-onset posttraumatic stress disorder in military personnel: is there evidence for this disorder?: Results of a prospective UK cohort study. *J Nerv Ment Dis,* 200(5), 429-37.
Greenland, S. & Thomas, D. C. (1982). On the need for the rare disease assumption in case-control studies. *American Journal of Epidemiology,* 116(3), 547-553.
Haley, R. W. (1998). Point: Bias from the "healthy-warrior effect" and unequal follow-up in three government studies of health effects of the Gulf War. *American Journal of Epidemiology,* 148(315-323).

Hamilton, A. B., Poza, I. & Washington, D. L. (2011). “Homelessness and Trauma Go Hand-in-Hand”: Pathways to Homelessness among Women Veterans. *Women's Health Issues,* 21(4, Supplement), S203-S209.

Haro, J. M., Arbabzadeh-Bouchez, S., Brugha, T. S., De Girolamo, G., Guyer, M. E., Jin, R., Lepine, J. P., Mazzi, F., Reneses, B., Vilagut, G., Sampson, N. A. & Kessler, R. C. (2006). Concordance of the Composite International Diagnostic Interview Version 3.0 (CIDI 3.0) with standardized clinical assessments in the WHO World Mental Health Surveys. *International Journal of Methods in Psychiatric Research,* 15(4), 167-180.

Harris, T., Kintzle, S., Wenzel, S. & Castro, C. A. (2017). Expanding the Understanding of Risk Behavior Associated With Homelessness Among Veterans. *Military Medicine,* 182(9), e1900-e1907.

Harvey, S. B., Hatch, S. L., Jones, M., Hull, L., Jones, N., Greenberg, N., Dandeker, C., Fear, N. T. & Wessely, S. (2011). Coming home: social functioning and the mental health of UK reservists on return from deployment to Iraq or Afghanistan. *Annals of Epidemiology,* 21(9), 666-672.

Hatch, S. L., Harvey, S. B., Dandeker, C., Burdett, H., Greenberg, N., Fear, N. T. & Wessely, S. (2013). Life in and after the Armed Forces: social networks and mental health in the UK military. *Sociol Health Illn,* 35(7), 1045-64.

Hides, L., Lubman, D. I., Devlin, H., Cotton, S., Aitken, C., Gibbie, T. & Hellard, M. (2007). Reliability and Validity of the Kessler 10 and Patient Health Questionnaire among Injecting Drug Users. *Australian & New Zealand Journal of Psychiatry,* 41(2), 166-168.

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist,* 44(3), 513-524.

Hotopf, M., Hull, L., Fear, N. T., Browne, T., Horn, O., Iversen, A. C., Jones, M., Murphy, D., Bland, D., Earnshaw, M., Greenberg, N., Hughes, J. H., Tate, A. R., Dandeker, C., Rona, R. & Wessely, S. (2006). The health of UK military personnel who deployed to the 2003 Iraq war: A cohort study. *Lancet,* 367, 1731-1741.

Jones, M., Sundin, J., Goodwin, L., Hull, L., Fear, N. T., Wessely, S. & Rona, R. J. (2013). What explains post-traumatic stress disorder (PTSD) in UK service personnel: deployment or something else? *Psychol Med,* 43(8), 1703-12.

Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S. L. T., Walters, E. E. & Zaslavsky, A. M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine,* 32(6), 959-976.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K. R., Rush, A. J., Walters, E. E. & Wang, P. S. (2003). The epidemiology of major depressive disorder: results from the National Comorbidity Survey Replication (NCS-R). *JAMA,* 289(23), 3095-105.

Kessler, R. C. & Ustun, T. B. (2004). The World Mental Health (WMH) survey initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *International Journal of Methods in Psychiatric Research,* 13(2), 93-117.

King, L. A., King, D. W., Vogt, D. S., Knight, J. & Samper, R. E. (2006). Deployment Risk and Resilience Inventory: A Collection of Measures for Studying Deployment-Related Experiences of Military Personnel and Veterans. *Military Psychology,* 18(2), 89-120.

Kok, B. C., Herrell, R. K., Thomas, J. L. & Hoge, C. W. (2012). Posttraumatic stress disorder associated with combat service in Iraq or Afghanistan: reconciling prevalence differences between studies. *J Nerv Ment Dis,* 200(5), 444-50.

Lipton, F. R., Siegel, C., Hannigan, A., Samuels, J. & Baker, S. (2000). Tenure in supportive housing for homeless persons with severe mental illness. *Psychiatric Services,* 51(4), 479-486.
McDonald, S. D. & Calhoun, P. S. (2010). The diagnostic accuracy of the PTSD checklist: a critical review. *Clinical Psychology Review,* 30(8), 976-87.
McFarlane, A. C., Hodson, S., Van Hooff, M., Verhagen, A. & Davies, C. (2011). *Mental health in the Australian Defence Force: 2010 ADF Mental Health Prevalence and Wellbeing Study: Full Report,* Canberra: Department of Defence.
McQuistion, H. L., Gorroochurn, P., Hsu, E. & Caton, C. L. (2014). Risk factors associated with recurrent homelessness after a first homeless episode. *Community Ment Health Journal,* 50(5), 505-513.
Memmott, P., Long, S., Chambers, C. & Spring, F. (2003). *Categories of Indigenous 'homeless' people and good practice responses to their needs* [Online]. AHURI Final Report No. 49, Australian Housing and Urban Research Institute, Melbourne. Available: http://www.ahuri.edu.au/publications/projects/p20168.
Metraux, S., Cusack, M., Byrne, T. H., Hunt-Johnson, N. & True, G. (2017). Pathways into homelessness among post-9/11-era veterans. *Psychological Services,* 14(2), 229.
Milliken, C. S., Auchterlonie, J. L. & Hoge, C. W. (2007). Longitudinal assessment of mental health problems among active and reserve component soldiers returning from the Iraq war. *JAMA,* 298(18), 2141-8.
Muthén, B. O., Muthén, L. K. & Asparouhov, T. (2017). *Regression and mediation analysis using Mplus,* Los Angeles, CA: Muthén Muthén.
Nicholson, C. (2006). A Review of the PTSD Checklist. Research Report 08/2006. Department of Defence Canberra, Australia.
O'Connell, M. J., Kasprow, W. & Rosenheck, R. A. (2008). Rates and risk factors for homelessness after successful housing in a sample of formerly homeless veterans. *Psychiatric Services,* 59(3), 268-275.
Pease, J. L., Billera, M. & Gerard, G. (2016). Military culture and the transition to civilian life: suicide risk and other considerations. *Social Work,* 61(1), 83-6.
Pedlar, D. & Thompson, J. M. (2016). *Toward a Military-CivilianTransition Theory and Conceptual Framework: Report of the International Summit held at the University of Southern California in March 2016.,* Los Angeles, CA: University of Southern California.
Persoskie, A. & Ferrer, R. A. (2017). A Most Odd Ratio:: Interpreting and Describing Odds Ratios. *American Journal of Preventive Medicine,* 52(2), 224-228.
Phillips, C. J., LeardMann, C. A., Gumbs, G. R. & Smith, B. (2010). Risk Factors for Posttraumatic Stress Disorder Among Deployed US Male Marines. *BMC Psychiatry,* 10(1), 52.
Ray, S. L. & Heaslip, K. (2011). Canadian military transitioning to civilian life: a discussion paper. *J Psychiatr Ment Health Nurs,* 18(3), 198-204.
Reijnen, A., Rademaker, A. R., Vermetten, E. & Geuze, E. (2015). Prevalence of mental health symptoms in Dutch military personnel returning from deployment to Afghanistan: a 2-year longitudinal analysis. *Eur Psychiatry,* 30(2), 341-6.
Reinert, D. F. & Allen, J. P. (2002). The alcohol use disorders identification test (AUDIT): a review of recent research. 26(2), 272-279.
Rosenheck, R. & Fontana, A. (1994). A model of homelessness among male veterans of the Vietnam War generation. *American Journal of Psychiatry,* 151, 421–427.
Sareen, J., Cox, B. J., Afifi, T. O., Stein, M. B., Belik, S. L., Meadows, G. & Asmundson, G. J. (2007). Combat and peacekeeping operations in relation to prevalence of mental disorders and perceived need for mental health care: findings from a large representative sample of military personnel. *Archives of General Psychiatry,* 64(7), 843-852.

Sayer, N. A., Carlson, K. F. & Frazier, P. A. (2014). Reintegration challenges in U.S. service members and veterans following combat deployment. *Social Issues and Policy Review,* 8(1), 33-73.

Sayer, N. A., Noorbaloochi, S., Frazier, P., Carlson, K., Gravely, A. & Murdoch, M. (2010). Reintegration problems and treatment interests among Iraq and Afghanistan combat veterans receiving VA medical care. *Psychiatr Serv,* 61(6), 589-97.

Searle, A. K., Fairweather-Schmidt, A. K., Saccone, E., McFarlane, A. C., Van Hooff, M., Tran, T., Hedges, L. & Lorimer, M. (2013). Detailed associations between deployment and disorder in the Australian Defence Force: Results from the 2010 ADF Mental Health Prevalence and Wellbeing dataset. Report for Joint Health Command. Canberra: Department of Defence.

Searle, A. K., Van Hooff, M., Lawrence-Wood, E. R., Grace, B. S., Saccone, E. J., Davy, C. P., Lorimer, M. & McFarlane, A. C. (2017). The impact of antecedent trauma exposure and mental health symptoms on the post-deployment mental health of Afghanistan-deployed Australian troops. *J Affect Disord,* 220, 62-71.

Searle, A. K., Van Hooff, M., McFarlane, A. C., Davies, C. E., Fairweather-Schmidt, A. K., Hodson, S. E., Benassi, H. & Steele, N. (2015). The validity of military screening for mental health problems: Diagnostic accuracy of the PCL, K10 and AUDIT scales in an entire military population. *International Journal of Methods in Psychiatric Research,* 24(1), 32-45.

Sheilds, D. M., Kuhl, D., Lutz, K., Freder, J., Baumann, N. & Lopresti, P. (2016). *Mental health and Well-Being of Military Veterans During Military to Civilian Transition: Review and Analysis of the Recent Literature,* Canada: Canadian Institute for Military and Veteran Health Research & Scientific Authority, Veterans Affairs Canada.

Shirt, L. (2012). *2011 Australian Defence Force Exit Survey Preliminary Report.,* Canberra: Commonwealth of Australia, Directorate of Strategic Personnel Policy Research.

Sim, M. R., Clarke, D., Forbes, A. B., Glass, D., Gwini, S., Ikin, J. F., Kelsall, H. L., McKenzie, D. P. & Wright, B. (2015). *Australian Gulf War Follow up Health Study: Technical Report* [Online]. Melbourne: Monash University. Available: https://www.dva.gov.au/sites/default/files/files/consultation%20and%20grants/healthstudies/gulfwar/follow_up2015/aus_gulf_war_follow_up_tech_report2015.pdf [Accessed October 2017].

StataCorp (2018). *Stata Statistical Software: Release 15.0,* StataCorp LP. College Station, TX.

Sundin, J., Fear, N. T., Iversen, A., Rona, R. J. & Wessely, S. (2010). PTSD after deployment to Iraq: conflicting rates, conflicting claims. *Psychol Med,* 40(3), 367-82.

Sundin, J., Herrell, R. K., Hoge, C. W., Fear, N. T., Adler, A. B., Greenberg, N., Riviere, L. A., Thomas, J. L., Wessely, S. & Bliese, P. D. (2014). Mental health outcomes in US and UK military personnel returning from Iraq. *British Journal of Psychiatry,* 204(3), 200-207.

Swann, J. & Hodson, S. (2004). *A psychometric analysis of the traumatic stress exposure scale - revised,* In Research report 09/04. Canberra: Department of Defence.

Teesson, M., Slade, T. & Mills, K. (2009). Comorbidity in Australia: findings of the 2007 National Survey of Mental Health and Wellbeing. *Australian & New Zealand Journal of Psychiatry,* 43(7), 606-14.

Thomas, J. T., Wilk, J. E., Riviere, L. A., McGurk, D., Castro, C. A., Hoge, C. W. (2010). The prevalence and functional impact of mental health problems among Active Component and National Guard soldiers 3 and 12 months following combat in Iraq. *Archives of General Psychiatry,* 67, 614-623.

Tsai, J. & Rosenheck, R. A. (2015). Risk Factors for Homelessness Among US Veterans. *Epidemiologic reviews,* 37, 177-195.
U.S. Department of Housing and Urban Development. (2017). *The 2017 Annual Homeless Assessment Report (AHAR) to Congress. PART 1: Point in Time Estimates of Homelessness* [Online]. Washington DC. Available: https://www.hudexchange.info/resources/documents/2017-AHAR-Part-1.pdf
Unwin, C., Blatchley, N., Coker, W., Ferry, S., Hotopf, M., Hull, L., Ismail, K., Palmer, I., David, A. & Wessely, S. (1999). Health of UK servicemen who served in Persian Gulf War. *The Lancet,* 353(9148), 169-178.
Van Hooff, M., Lawrence-Wood, E., Hodson, S., Sadler, N., Benassi, H., Hansen, C., Grace, B., Avery, J., Searle, A., Iannos, M., Abraham, M., Baur, J. & McFarlane, A. (2018). *Mental Health Prevalence, Mental Health and Wellbeing Transition Study,* the Department of Defence and the Deparment of Veterans' Affairs Canberra.
Van Hooff, M., Searle, A., Avery, J., Lawrence-Wood, E., Hilferty, F., Katz, I., Zmudski, F. & McFarlane, A. (2019). *Homelessness and its Correlates in Australian Defence Force Veterans, Mental Health and Wellbeing Transition Study*: Report for the Department of Veterans' Affairs, Canberra.
Vittinghoff, E. & McCulloch, C. E. (2007). Relaxing the rule of ten events per variable in logistic and Cox regression. *American Journal of Epidemiology,* 165(6), 710-718.
Wainwright, V., McDonnell, S., Lennox, C., Shaw, J. & Senior, J. (2016). Soldier, civilian, criminal: identifying pathways to offending of ex-armed forces personnel in prison. *Psychology, Crime & Law,* 22(8), 741-757.
Weathers, F. W., Litz, B. T., Herman, D. S., Huska, J. A. & Keane, T. M. (1993). *The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility.,* Paper presented at the 9th Annual Conference of the ISTSS: San Antonio, TX.
Wilkins, K. C., Lang, A. J. & Norman, S. B. (2011). Synthesis of the psychometric properties of the PTSD checklist (PCL) military, civilian, and specific versions. *Depression and Anxiety,* 28(7), 596-606.
Zhang, J. & Yu, K. F. (1998). What's the relative risk? A method of correcting the odds ratio in cohort studies of common outcomes. *JAMA,* 280(19), 1690-1691.

Australian Housing and Urban Research Institute

Level 1
114 Flinders Street
Melbourne Victoria 3000

T +61 3 9660 2300
E information@ahuri.edu.au

ahuri.edu.au

ACN 090 448 918

twitter.com/AHURI_Research
facebook.com/AHURI.AUS
evid.in/AHURI_LinkedIn