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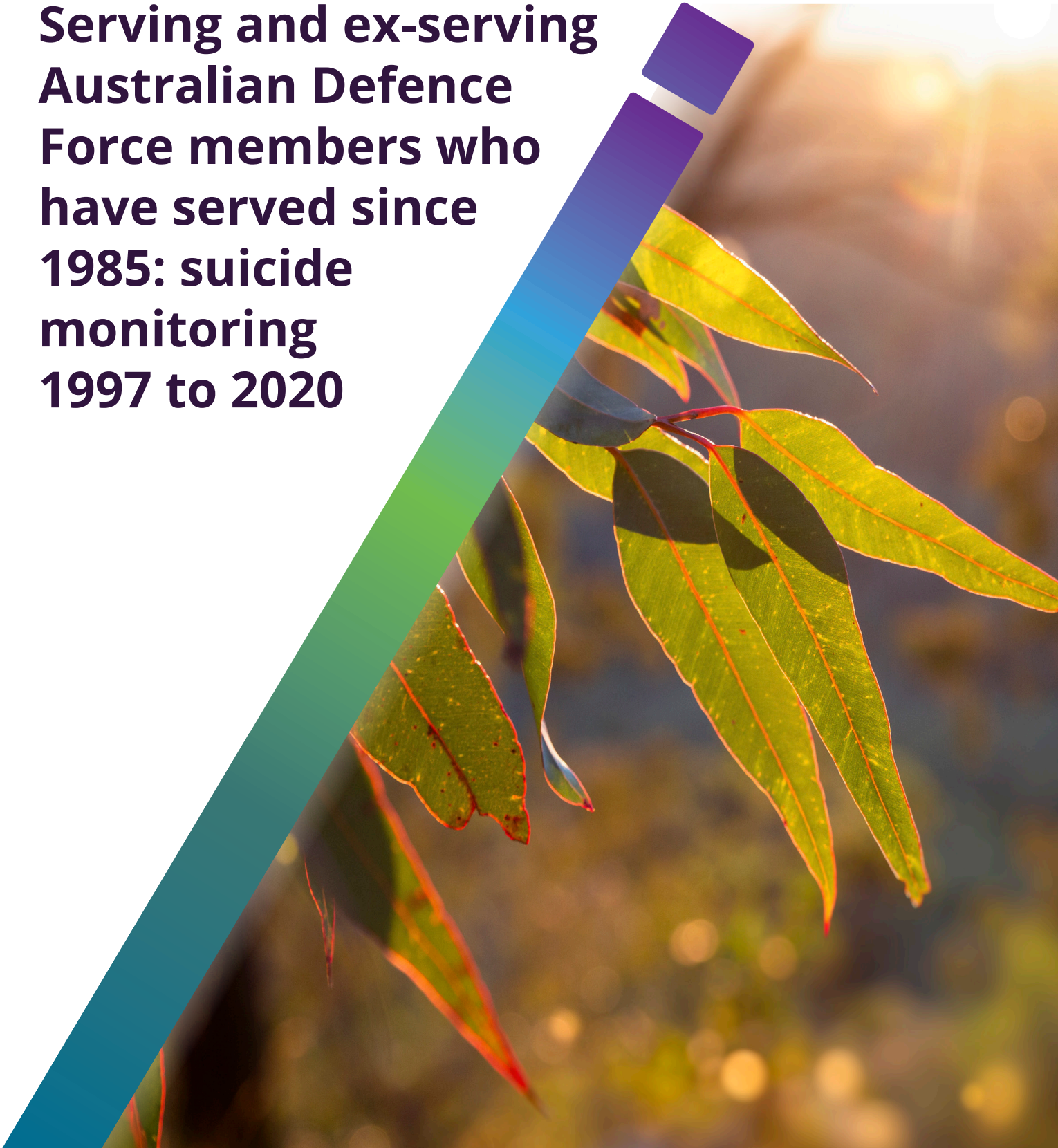
Serving and ex-serving Australian Defence Force members who have served since 1985: suicide monitoring 1997 to 2020



Serving and ex-serving Australian Defence Force members who have served since 1985: suicide monitoring 1997 to 2020

Australian Institute of Health and Welfare
Canberra
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Summary

This is AIHW's fifth annual report on suicide among permanent, reserve, and ex-serving ADF members ('member' is used throughout to refer to both serving and ex-serving). This report includes members with at least one day of ADF service from 1 January 1985 to 31 December 2020, with the suicides monitored over the period 1 January 1997 to 31 December 2020. This monitoring period is expanded and includes more years than in the previous report (1 January 2001 to 31 December 2019). The expanded monitoring period was included following investigations of ADF member deaths data through the years 1997-2000, and was updated to include 2020 as the most recent year of data available.

The general patterns, including rates of suicide and comparisons with the Australian population, remain similar to previous AIHW reports. However, as the suicide monitoring period used in this report has expanded there is an increase in the number of suicides.

Further information on the veteran population scope and expanded monitoring period can be found in the Technical notes.

Permanent and reserve males have a lower risk of suicide	Permanent and reserve males are about half as likely to die by suicide as Australian males (49% and 46% lower respectively).
Ex-serving males and females have an increased risk of suicide	Ex-serving males are 27% more likely to die by suicide than Australian males, and ex-serving females are 107% more likely (or about twice as likely) to die by suicide than Australian females. However, rates vary within the subpopulations of the ex-serving cohort.
Males who separate voluntarily have similar rates of suicide to the Australian population	The suicide rate for ADF ex-serving males who separate voluntarily is similar to the general Australian population as measured by the age-adjusted suicide rate.
Males who separate for involuntarily medical reasons have an increased risk of suicide	The suicide rate for ADF ex-serving males who separate for involuntarily medical reasons is around three times the rate of those who separate voluntarily (69.8 and 22.5 per 100,000 population per year respectively).
Mood (affective) disorders (including depression) were the most common risk factor	Around half (49%) of all ADF males and 66% of all ADF females who died by suicide were identified as having mood (affective) disorders.
Problems in spousal relationship and suicide ideation were the second and third most common risk factors for males	Around 4 in 10 (41%) ADF males who died by suicide were identified as having problems in spousal relationship circumstances, with nearly 3 in 10 (29%) identified as having suicide ideation.
Personal history of self-harm and problems in spousal relationship were the second and third most common risk factors for females	Almost 2 in 5 (38%) ADF females who died by suicide were identified as having a personal history of self-harm, and problems in spousal relationship circumstances (38%).

Introduction

Background

In 2014 the Australian Department of Veterans' Affairs (DVA) and Australian Institute of Health and Welfare (AIHW) established a partnership to build a comprehensive profile of the health and welfare of Australia's veteran population. AIHW has worked with the Department of Defence (Defence) to link information from Defence personnel systems to a variety of health and welfare data to better understand the veteran population. This includes analyses on cause of death, use of health services and pharmaceuticals, and use of homelessness services. In 2017, the Australian Government responded to the Senate Inquiry Report, *The Constant Battle: Suicide by Veterans* by committing to provide an annual update on the levels of suicide among permanent, reserve, and ex-serving ADF members. In addition, recent government strategic priorities have highlighted improvements to data and evidence-based research as being essential enablers of effective suicide prevention, with all agencies and levels of government having a role to play (National Suicide Prevention Adviser 2020). This report is the fifth annual update reporting the levels of suicide among ADF members.

The first three reports included ADF members who served from 2001 based on the availability of information at that time from the Defence Personnel Management Key Solution (PMKeyS), which was launched on 1 January 2001. For the fourth report, published in 2021, DVA commissioned AIHW to investigate the feasibility of using data from earlier Defence personnel systems to build a more comprehensive picture of the ex-serving population. The Department of Defence supported this research by compiling records from historical systems. After extensive investigation and validation of data sources a population study cohort based on all ADF members with at least one day of service since 1 January 1985 was established and included for analysis. More information about this process is contained in the Technical notes.

AIHW acknowledges that the data presented in this report represent human lives and we acknowledge all of those serving and ex-serving ADF members who have died by suicide. We also acknowledge all of those who have been affected by suicide. We are committed to ensuring our work continues to inform improvements in mental health, and suicide awareness and prevention.

What is included in this report?

This report includes information on suicide deaths among ADF members who have served at least one day since 1 January 1985 and have died by suicide between 1 January 1997 and 31 December 2020.

In this report, the term 'ADF members' collectively refers to the three categories of 'currently serving permanent', 'currently serving reserves', and 'ex-serving' members (Box 1). These three ADF service status groups will be referred to as permanent, reserve, and ex-serving for the remainder of this report.

As of 31 December 2020, almost 379,000 Australians had served at least one day in the ADF between 1 January 1985 and 31 December 2020. Of these, approximately 362,000 were alive, comprising 60,000 permanent, 39,000 reserve, and 263,000 ex-serving members.

Last year's report was based on ADF members with at least one day of service since 1 January 1985 who died by suicide between 1 January 2001 and 31 December 2019. The current report uses the same ADF cohort (plus the 2020 data) and expands the suicide

monitoring period to 1 January 1997 to 31 December 2020. This extended period permits the analysis of earlier suicide deaths and more ADF subpopulations at risk of suicide. Care should be taken in directly comparing data in this report with previous AIHW publications due to the wider monitoring period.

Information in this report is presented by service status, age, sex, service, rank, length of service, time since separation and reason for separation. These factors were assessed independently to determine rates of death by suicide as well as concurrently using multi-factor survival modelling analysis[1].

This year's report includes a special 'in-focus' section, which presents information on risk factors for ADF members who died by suicide, including biological, psychological and psychosocial risk factors. Risk factors were captured in causes of death coding conducted by the Australian Bureau of Statistics (ABS) both as part of routine coding and as commissioned by the AIHW for this project. The analysis acknowledges that suicide is affected by a complex interaction of factors over the course of an individual's lifetime. Understanding these risk factors can inform approaches to suicide prevention.

The 'in-focus' section includes information on risk factors and service-related characteristics among ADF members who have served at least one day since 1 January 1985 in relation to deaths by suicide between 1 January 2001 and 31 December 2020. Analysis of risk factors among people who died by suicides in the Australian population are presented to understand whether ADF members have different risk factors for suicide compared with the general Australian population.

It should be noted that the female ADF cohort is smaller than the male cohort and, in general, suicide rates for females in the Australian population are low. The Confidence Intervals (CIs) for statistics relating to female ADF members in this report are wide, meaning that there is less certainty in the accuracy of the statistic. This affects our ability to detect statistically significant differences between the female ADF cohort and Australian females overall. As a result, caution should be taken in interpreting these data.

[1] 'Survival modelling analysis' here is a generic term for statistical methods used to describe the time it takes for an event to occur after some intervention, termed 'survival time'.

Box 1: Who is included in this report?

Permanent: ADF members serving in a full-time capacity in the Royal Australian Navy (Navy), Australian Army (Army) or the Royal Australian Air Force (Air Force) on or after 1 January 1985, and serving in a permanent capacity on 31 December 2020 or on the date they died.

Reserve: ADF members who were in the reserve forces for the Navy, Army, or the Air Force on or after 1 January 1985, and were in the reserve forces on 31 December 2020 or when they died. Many members leaving full-time service transition to the reserves for a minimum of five years. The service status 'reserve' includes members with a wide range of relationships to the ADF. For example, it includes personnel who have transitioned from full time service as well as both those who joined and have served solely in reserve capacity. Some reserve members may serve with enduring regular employment (active reserves), while others may not render service in any capacity (standby reserves)[2].

Ex-serving: ADF members who were in the permanent or reserve services between 1 January 1985 and 31 December 2020, who subsequently transitioned from Defence.

Each release updates previously published numbers of suicides to reflect updates to the source data. The main reasons for changes to previously published results are:

- Use of an expanded monitoring period, in this case deaths by suicide from 1997 to 2020 (previously this period was 2001 to 2019) for those who served at least one day from 1 January 1985 are included.
- A lag in cause of death information for more recent years of data, where cause of death is finalised in the following years.
- Revisions to cause of death data by the Australian Bureau of Statistics (ABS).
- Improvements in information available to the study.

More detail on these reasons for changes to previously published information is provided in the Technical notes.

What is not included in this report?

This report does not include data on several areas that may be of relevance to a study of suicide in the ADF member population and would benefit from further exploration. For example, data are not included on living members who have experiences with suicide ideation, attempted suicide, or intentional self-harm, as this report only presents information on confirmed deaths by suicide. Deaths that lack sufficient evidence to make a ruling of suicidal intent (such that they are unable to be classified as a confirmed suicide) are also not included.

Further investigations with experts on the Defence HR personnel datasets are underway to investigate the possibility of analysing the impact of deployment, including type of deployments and occupations while on deployment. Obtaining further information on ADF

[2] There was no statistically significant difference in suicide rates between the active and standby reserves. See the Technical notes for more details.

members who separated involuntarily for medical reasons is also under investigation, to gain a better understanding of how this may affect deaths by suicide among this group.

Consideration is also being given to comparing subpopulations within the ADF cohort with more appropriate alternative populations. For instance, comparing people who separate from the ADF for medical reasons with people who have similar medical conditions in the general Australian population.

For some of the proposed analyses more time is needed. For others, no data are readily available, and these will require data development or linkage before information can be reported.

If you need help or support, please contact:
Open Arms - Veterans and Families Counselling **1800 011 046**
Open Arms Suicide Intervention page
Defence All-hours Support Line (ASL) **1800 628 036**
Defence Member and Family Helpline **1800 624 608**
Defence Chaplaincy Support **1300 333 362**
ADF Mental Health Services
Lifeline **13 11 14**
Suicide Call Back Service **1300 659 467**
Beyond Blue Support Service **1300 22 4636**

For information on support provided by DVA, see:
Mental health support services
Free mental health care for veterans

Notes on measuring death by suicide

Information on suicide is presented in four ways in this report.

1. Overall counts of suicides are presented to give an indication of the total scale.
2. Suicide rates are reported to compare across groups within the permanent, reserve, and ex-serving cohorts, to take into account the size of the underlying population.
3. Age-adjusted suicide rates and Standardised Mortality Ratios (SMRs) are used to compare rates of suicide between groups with different age structures, such as when comparing the permanent, reserve, and ex-serving populations with the general Australian population.
4. Hazard ratios (HRs) are used in survival modelling to compare the hazard or likelihood of suicide between groups within the model.

Confidence Intervals of 95% are used to assess uncertainty in suicide rates. CIs give some indication of how close the true rate lies to the calculated rate. Narrower CIs indicate more certainty in the result, and wider intervals means less certainty in the result.

More information on these concepts is in the Technical notes.

Box 2: The ADF population with at least one day of service since 1 January 1985 and how it compares with the Australian population

As of 31 December 2020, almost 379,000 Australians had served at least one day in the ADF between 1 January 1985 and 31 December 2020. Of these, approximately 362,000 were still alive, comprising 60,000 permanent, 39,000 reserve, and 263,000 ex-serving members.

Since 1985 the ex-serving population with at least one day of service since 1 January 1985 has increased each year as permanent and reserve ADF members separate. At the end of 1985, 6,100 members of this cohort had separated and by the end of 2020 this had grown to 277,000 (of whom 260,000 are still alive). As members leave the permanent and reserve service they are counted as members of the ex-serving study population until they die.

The permanent, reserve, and ex-serving populations have different demographics to the Australian population overall. While the Australian population is 50% male, the ADF population is 85% male. The serving ADF population is on average younger than the Australian population.

These age and sex differences are considered when examining differences in suicide levels between these populations.

See the AIHW report *Serving and ex-serving Australian Defence Force members who have served since 1985: population characteristics 2019* for more detail on the ADF population characteristics.

Analysis

Suicides by sex and service status group

Suicides by sex and service status group

Overview

This section presents suicide rates, age-adjusted suicide rates and numbers of deaths by suicide between 1997 and 2020 broken down by the service status groups (permanent, reserve, and ex-serving). While the absolute number of deaths by suicide has increased since the previous report (due to the expansion of the monitoring period to include suicide deaths from 1997) the suicide rates remain similar across both reports, indicating that the overall patterns in suicide risk remain the same.

How do suicide rates vary by service status and sex?

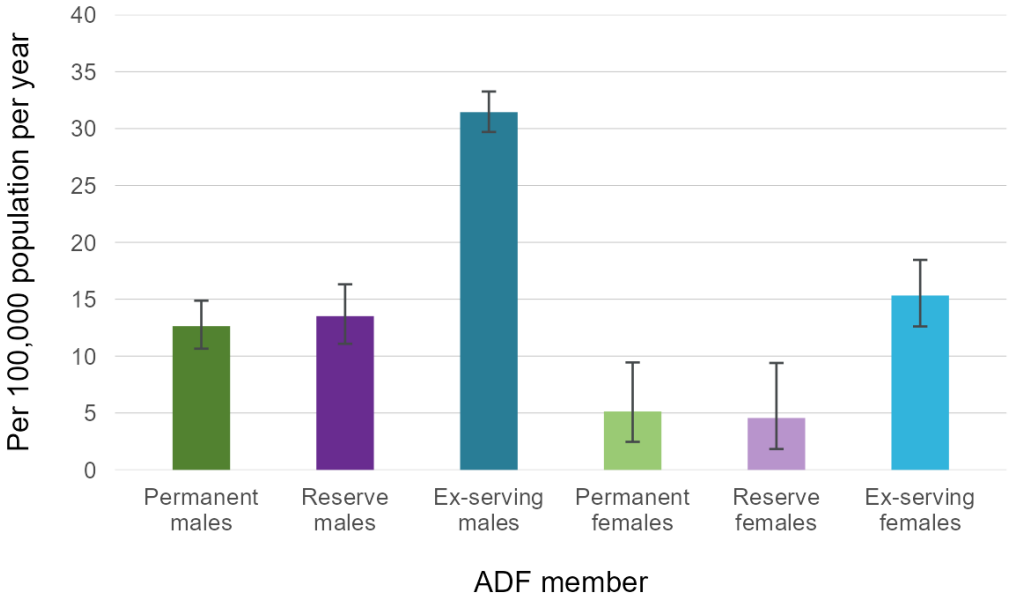
For those with service since 1985, the suicide rate was highest for ex-serving males.

Suicide rates between 1997 and 2020 by service status and sex were as follows:

- 12.6 per 100,000 population per year for permanent males
- 13.5 per 100,000 population per year for reserve males
- 31.4 per 100,000 population per year for ex-serving males
- 5.1 per 100,000 population per year for permanent females
- 4.6 per 100,000 population per year for reserve females
- 15.3 per 100,000 population per year for ex-serving females

These numbers are given in Figure 1 below. It is important to note that none of these groups are homogeneous (there are likely other underlying factors contributing) and these overall figures are not the full picture. The remainder of this report is dedicated to determining differences between subgroups of serving and ex-serving ADF members.

Figure 1: Suicide rate by service status group and sex, 1997–2020



Note: Due to the difference in age profiles with the Australian population a direct comparison in suicide rates with the ADF population is not appropriate here. A comparison with the general Australian population using SMRs is given in the next section *How do suicide rates for permanent, reserve, and ex-serving ADF members compare to the general population?*

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

How many ADF members died by suicide over the study period within each service status group?

Between 1997 and 2020 there were 1,600 certified deaths by suicide among members with ADF service since 1 January 1985. Of these, 1,330 (83%) occurred among ex-serving members, 154 among permanent members, and 115 among reserves. This is presented in Table 1.

Table 1: Total number of deaths by suicide, ADF members and Australian population, 1997–2020

	Males	Females	Persons
Serving	144	10	154
Reserve	108	7	115
Ex-serving	1,219	111	1,330
All ADF members[(a)]	1,471	128	1,600
Australian population[(b)]	47,991	14,416	62,407

Notes:

a. For records where year of death was unavailable, records were added to the 'all ADF members' total suicide deaths, but are suppressed in other calculations.

b. Number of deaths by suicide from all ADF members are included in the Australian population deaths by suicide count.

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
AIHW suicide and self-harm monitoring report data 1997–2020.

The number of deaths by suicide for permanent and reserve members combined and ex-serving members by year, is presented in Table 2. For the number of deaths by suicide for males and females by year see Supplementary table S2.3.

When interpreting Table 2, it is important to remember that the ex-serving population increases each year as described in Box 2. As such the increase in ex-serving suicides across the years 1997 to 2020 is not indicative of any increase in suicide rate, which can be seen from the ex-serving male and female time series in Figure 2. (For population sizes by year see supplementary tables S10.2 to S10.4, see Data for a link to the tables.)

Table 2: Number of deaths by suicide by year, ADF service status groups, 1997–2020

Year	Permanent and reserve	Ex-serving	Total in all ADF service groups[(a)]
1997	11	41	52
1998	13	55	68
1999	7	50	57
2000	16	48	64

Continued

Table 2 (continued): Number of deaths by suicide by year, ADF service status groups, 1997–2020

Year	Permanent and reserve	Ex-serving	Total in all ADF service groups[(a)]
2001	18	47	65
2002	14	37	51
2003	8	51	59
2004	12	44	56
2005	*n.p.*	*n.p.*	51
2006[(b)]	*n.p.*	*n.p.*	42
2007[(c)]	11	48	59
2008	8	50	58
2009	13	46	59
2010	13	63	76
2011	10	62	72
2012	7	53	60
2013	12	55	67
2014	12	68	80
2015	10	69	79
2016	15	76	91
2017	16	70	86
2018	6	71	77
2019	14	77	91
2020	12	67	79
Total[(d)]	269	1,330	1,600

Continued

Table 2 (continued): Number of deaths by suicide by year, ADF service status groups, 1997–2020

n.p. Not available for publication but included in totals where applicable, unless otherwise indicated. In this case this is a result of low numbers being potentially identifying.

Notes:

a. Consists of deaths by suicide in males and females for permanent, reserve, and ex-serving ADF members.

b. From 2006 onwards, the ABS implemented a revisions process for coroner-certified deaths (such as suicides). This improved data quality by enabling additional deaths by suicide to be identified beyond initial processing (ABS 2018). For detailed information, see Technical notes.

c. New ABS coding guidelines were applied for deaths registered from 1 January 2007. The new guidelines improve data quality by enabling deaths to be coded as suicide by ABS mortality coders if evidence indicates the death was from intentional self-harm (ABS 2018). For detailed information, see the Technical notes.

d. For records where year of death was unavailable, records were added to the 'all ADF members' total suicide deaths, but are suppressed in other calculations.

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

How do suicide rates for permanent, reserve, and ex-serving ADF members compare to the general population?

After adjusting for age differences (using calculated Standardised Mortality Ratios, or SMRs, to control for differences in age distributions between the ADF and Australian populations), permanent and reserve males had a lower rate of suicide than the general Australian population. However, ex-serving males and females had a higher rate of suicide than the general Australian male and female population, respectively.

Compared with the Australian male or female population (whichever is appropriate), suicide rates between 1997 and 2020 were:

- 49% lower for permanent males
- 46% lower for reserve males
- 27% higher for ex-serving males
- 107% (or 2.07 times) higher for ex-serving females

The differences between the Australian population and both permanent and reserve females were not statistically significant, and so the results do not appear here. Other differences are statistically significant. While the 107% figure for ex-serving females is larger than the 27% figure for ex-serving males, it should be noted that these are both a comparison with the general Australian population. The crude rate for ex-serving females is significantly lower than it is for ex-serving males (as shown in Figure 1).

It is important to note that these groups are not homogeneous. There are other underlying factors which are explored throughout the rest of this report.

Unlike suicide rates, these SMRs cannot be used to compare suicide rates between service groups or across time. This is because each SMR is a measure that provides a comparison that is specific to the two populations involved, see the Technical notes for further detail.

How have suicide rates changed over time for the different service status groups?

This section presents suicide rates over time, in 3-year periods. Due to small numbers there is some variability in these rates. Over the study period:

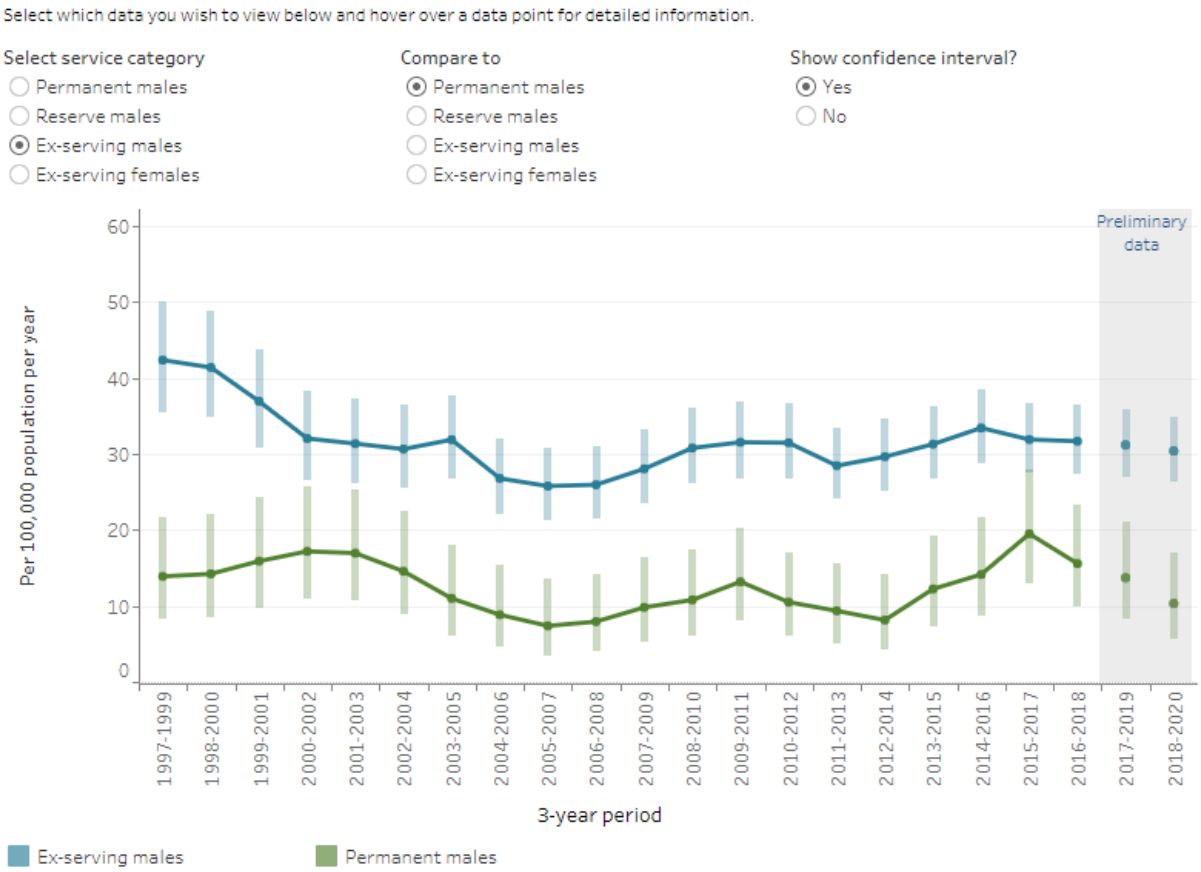
- The suicide rate for permanent males remained relatively constant, ranging between 13.9 deaths per 100,000 population per year in 1997–1999 and 10.3 in 2018–2020.
- The suicide rate for males in the reserves remained relatively constant, allowing for the confidence interval, ranging between 8.4 deaths per 100,000 population per year in 2003–2005 and 15.3 in 2018–2020.
- The suicide rate for ex-serving males remained relatively constant, ranging between 25.8 per 100,000 population in 2005–2007 and 30.4 in 2018–2020. There was an overall drop in the rate of suicide from the late 1990s to the mid 2000s, which is consistent with the pattern observed in Australian males over the same period.
- The suicide rate for ex-serving females has fluctuated between 7.5 deaths per 100,000 population per year in 2003–2005 and 23.4 in 2015–2017. There is no easily identifiable trend, and there are large confidence intervals around these rates throughout due to the low total numbers.

The rates of suicide for males and females for the Australian general population are presented in the final two graphs of this section (Figures 2[3] and 3) for comparison.

The interactive graph below presents the suicide rates for males in each of the three ADF service status groups and ex-serving females, for all 3-year periods from 1997-1999 to 2018-2020.

[3] This figure is a screenshot of an interactive figure, with the interactivity disabled. Screenshots of all selection options can be found in the Appendix. The full figure is available in the web report.

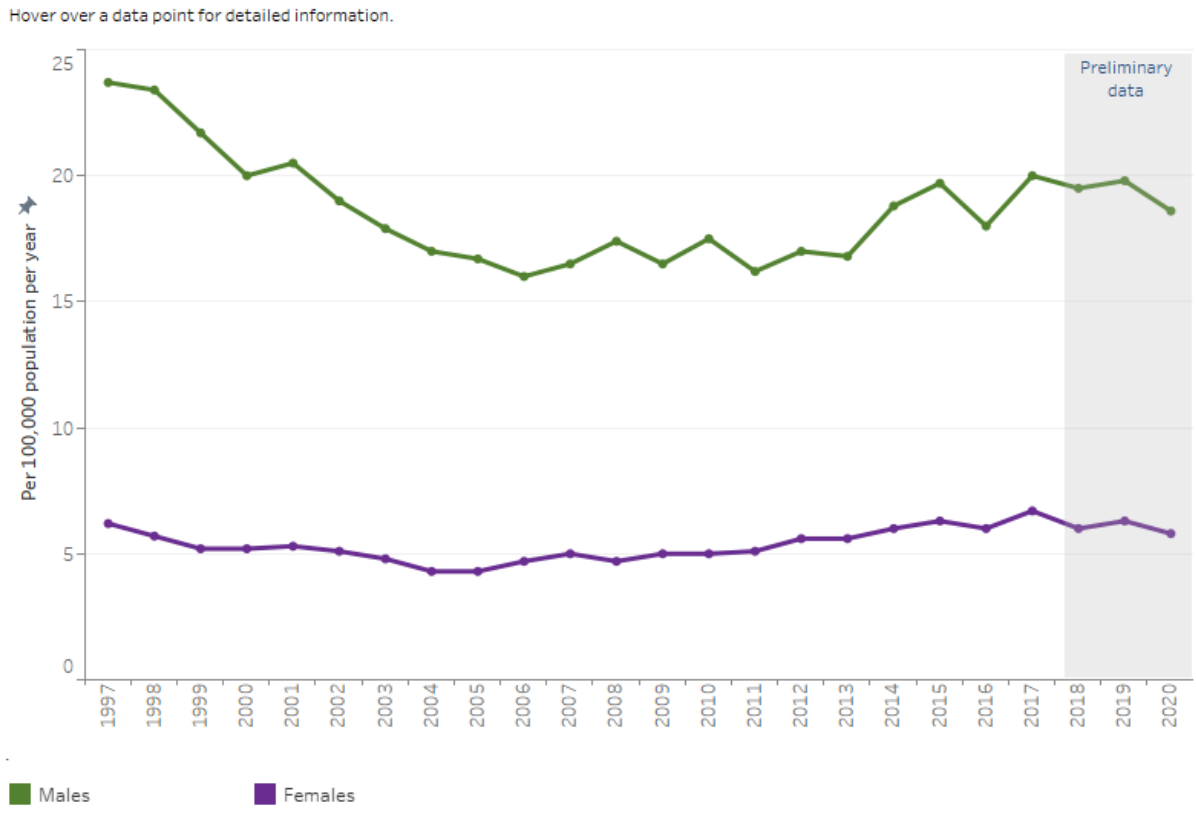
Figure 2: Rate of suicide by service status and sex, 1997–1999 to 2018–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Note*:* The confidence intervals in this figure can be used to determine whether there is a statistically significant difference between the suicide rates calculated for the ADF between different 3-year periods. However, they *cannot* be used to determine whether there is a statistically significant difference between rates calculated for the ADF population for overlapping 3-year time periods (for example 2002–2004 and 2003–2005).

Figure 3: Australian males and females, age-standardised rate, 1997–2020



Note: Age-standardised death rate. Death rate per 100,000 estimated resident population as at 30 June (mid year).

Source: AIHW suicide and self-harm monitoring report data 1997–2020.
http://www.aihw.gov.au

Data underlying this graph are available in Supplementary tables S3.2, S5.2 and S6.1. See Data for a link to the tables.

Please note, data for more recent years are subject to change: see the Technical notes for further detail.

How do suicide rates compare between ex-serving members with permanent service and reserve service?

Ex-serving ADF members can have either served in the permanent or reserve forces, or a combination of both over their ADF service career. The level of service duties and obligations vary greatly between the two, with permanent forces expected to render higher levels of service than reserves[4]. This section explores suicide rates for the ex-serving cohorts.

[4] From 2016 Defence introduced the ADF Total Workforce System which outlines the spectrum of service categories and service options that cover the range of service duties and obligations across ADF serving personnel. Since this categorisation has only been in use since 2016 it is not used in this analysis.

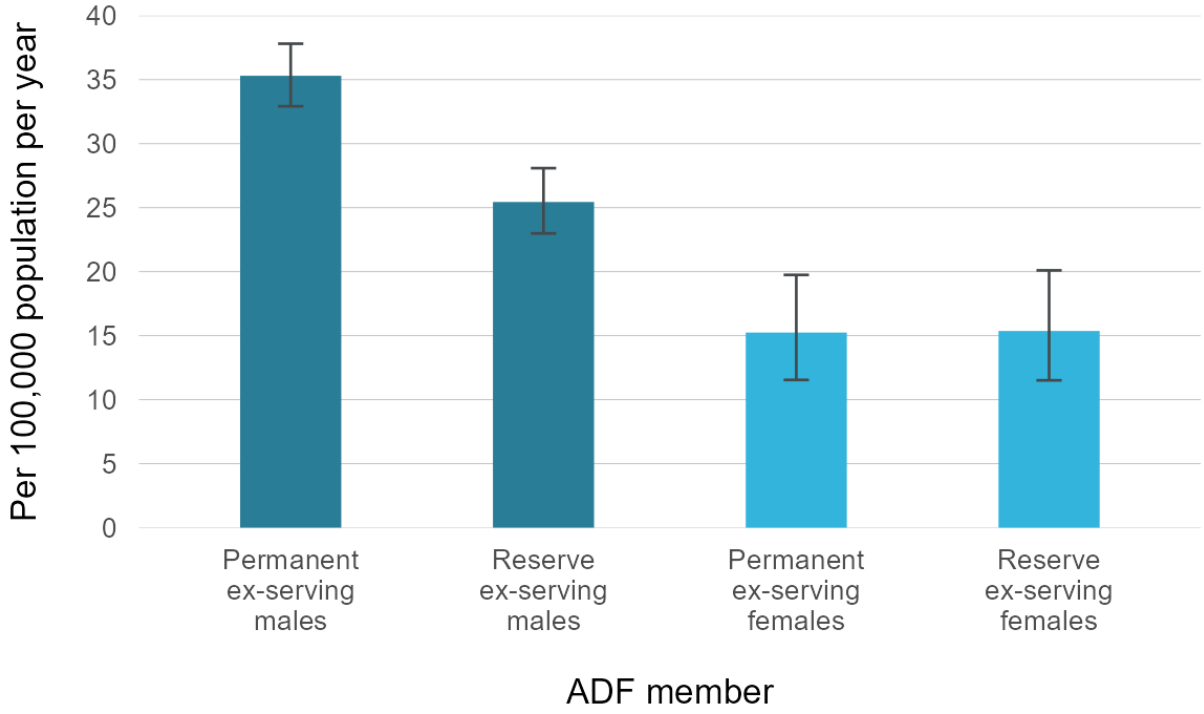
In this section, ex-serving members who were at any time engaged in permanent service will be considered ‘permanent ex-serving’, even if they were engaged in reserve service before fully separating. By contrast, those who joined and served solely in a reserve capacity will be considered ‘reserve ex-serving’. This distinction will not be kept throughout the report.

Between 1997 and 2020 the suicide rates for the ex-serving cohort were:

- 35.3 per 100,000 population per year for permanent ex-serving males
- 25.4 per 100,000 population per year for reserve ex-serving males
- 15.2 per 100,000 population per year for permanent ex-serving females
- 15.4 per 100,000 population per year for reserve ex-serving females

These values are shows in the Figure 4 below.

Figure 4: Suicide rates for permanent ex-serving and reserve ex-serving, males and females, 1997–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

This figure demonstrates that there is a higher suicide rate among permanent ex-serving males compared with reserve ex-serving males. It should be noted that most involuntary medical separations come from the permanent ex-serving cohort, which may explain this difference in rates (see the *Suicides by reason for separation* section). There was no corresponding statistically significant difference among the female cohorts.

Further exploring the interaction between permanent service and involuntary medical separation is a potential inclusion for future reports.

Data underlying this section are available in supplementary tables S3.1, S4.1, and S4.2. See Data for a link to the tables.

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Defence All-hours Support Line (ASL) **1800 628 036**
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Suicides by age

Suicides by age

Ex-serving males and females

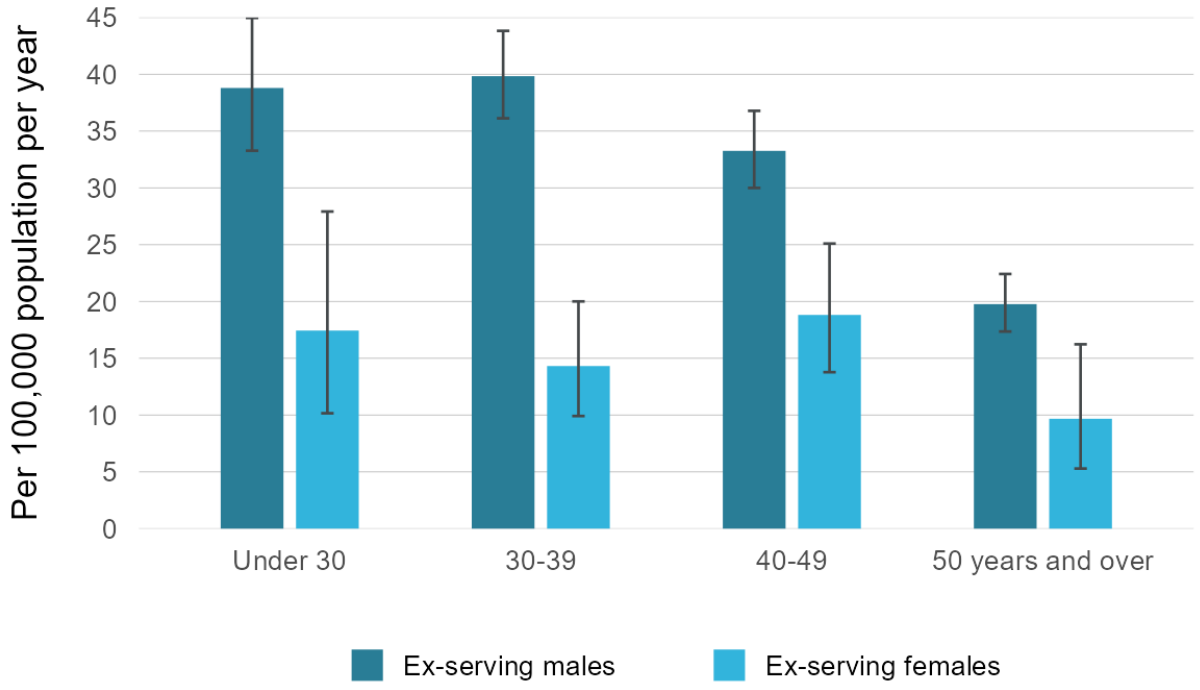
The suicide rates for both ex-serving males and females between 1997 and 2020 varied by age at time of suicide death.

Between 1997 and 2020, the suicide rate for ex-serving males aged 50 years and over was significantly lower than ex-serving males under 50 years of age (19.8 and 36.8 per 100,000 population per year). There was no statistical difference between any of the male age cohorts under 50 years of age.

There was no statistical difference between the ex-serving females suicide rates by age.

This is shown in Figure 5 below.

Figure 5: Suicide rate by age group, ex-serving males and females, 1997–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Suicide rates by age compared with the Australian population

The age-specific suicide rates for ex-serving males and females aged 50 years and over were similar to Australian males and females in the same age group. However, the age-specific suicide rates for ex-serving males and females were higher than the Australian population for all other age groups. For those under 30, the suicide rate was nearly three times higher for ex-serving females compared with Australian females, and almost twice as high for ex-serving males compared with Australian males.

The full set of values is given in Tables 3 and 4 below. As previously, comparisons are made here with the Australian population to provide context.

Table 3: Suicide rate by age group, ex-serving males and Australian males, 1997–2020

Age group	Male ex-serving suicide rate (per 100,000 population per year)	Male Australian suicide rate[(a)] (per 100,000 population per year)	Significant difference to Australian population
Under 30	38.8	22.6	Yes, Higher
30-39	39.9	27.0	Yes, Higher
40-49	33.3	26.8	Yes, Higher
50 years and over	19.8	20.9	No

Note:

a. The age range for Australian males was matched to the ex-serving ADF males age range (minimum and maximum ages were 17 and 95 respectively).

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020; NMD 1985–2020.

Table 4: Suicide rate by age group, ex-serving females and Australian females, 1997–2020

Age group	Female ex-serving suicide rate (per 100,000 population per year)	Female Australian suicide rate[(a)] (per 100,000 population per year)	Significant difference to Australian population
Under 30	17.4	6.3	Yes, Higher
30-39	14.3	7.4	Yes, Higher
40-49	18.8	7.8	Yes, Higher
50 years and over	9.7	6.4	No

Note:

a. The age range for Australian females was matched to the ex-serving ADF females age range (minimum and maximum ages were 17 and 90 respectively).

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020; NMD 1985–2020.

Suicide rate by age over time

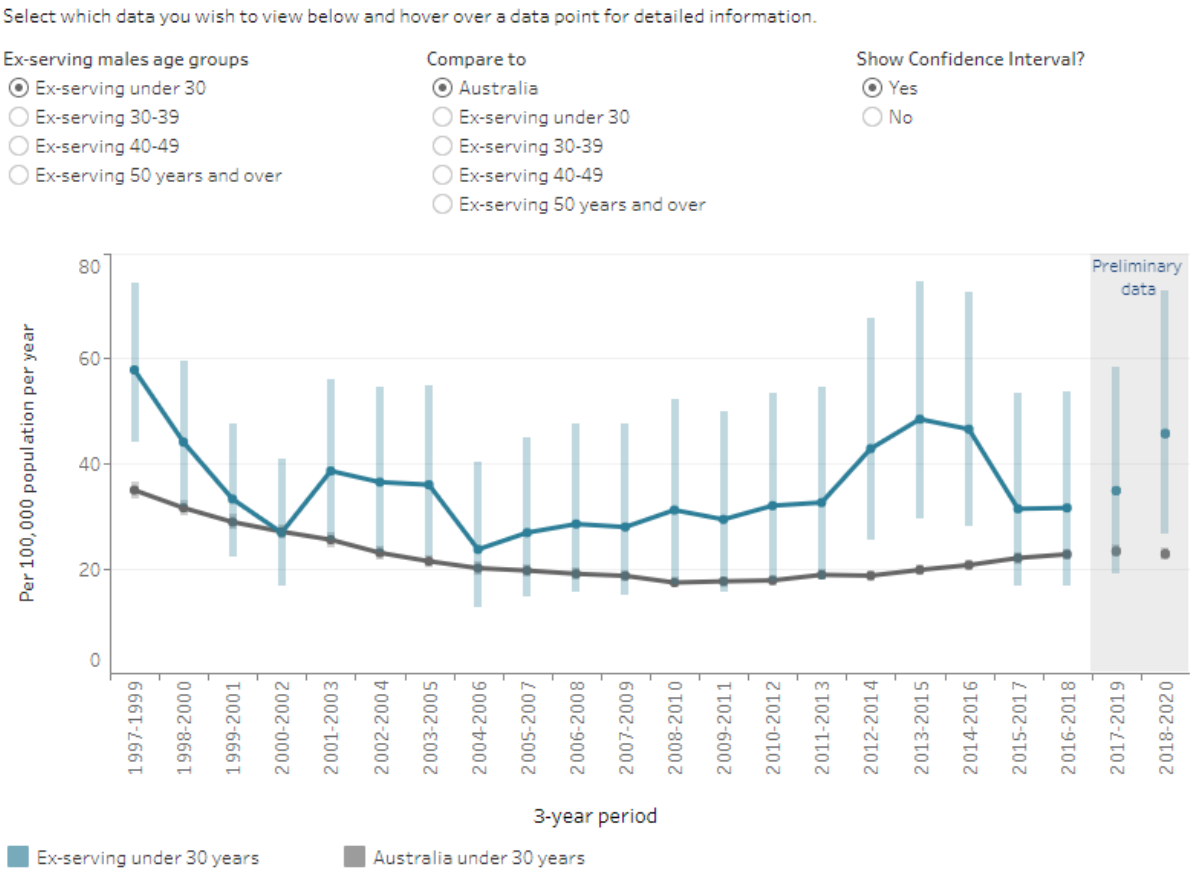
There is some fluctuation over time in the suicide rates by age group, however most differences are not statistically significant.

Due to the small number of suicide deaths among ex-serving females, suicide rates by age over time are not reported.

The suicide rate for ex-serving males, by age group, is compared with the rate for Australian males in the same age range in the interactive graph below (Figure 6[5]). Select an age group from the menu to display the comparison.

[5] This figure is a screenshot of an interactive figure, with the interactivity disabled. Screenshots of all selection options can be found in the Appendix. The full figure is available in the web report.

Figure 6: Rate of suicide, ex-serving and Australian males by age, 1997–1999 to 2018–2020



Source: AIHW analysis of linked Defence historical personnel data– PMKeyS–NDI data 1985–2020; ; NMD 1985–2020.
http://www.aihw.gov.au

Notes:

The confidence intervals in this figure can be used to determine whether there is a statistically significant difference between the suicide rates calculated for the ADF between different 3-year periods. However, they cannot be used to determine whether there is a statistically significant difference between rates calculated for the ADF population for overlapping 3-year time periods (for example 2002–2004 and 2003–2005).

Minimum and maximum ages of Australian males were matched to the minimum and maximum ages of ADF ex-serving males for each year within 3-year periods.

Data underlying this graph are available in supplementary table S6.2 and S6.3. See Data for a link to the tables.

Please note, data for recent years are subject to change; see Technical notes for further detail.

Suicide rates by age and service status

Permanent and reserve males' suicide rates were similar regardless of their age at death (see Table 5 and Figure 7 below).

Table 5: Male suicide rate by age group and service status, 1997–2020

Age group[(a)]	Permanent suicide rate (per 100,000 population per year)	Reserve suicide rate (per 100,000 population per year)	Ex-serving suicide rate (per 100,000 population per year)
Under 30	14.0	13.2	38.8
30-39	10.7	16.9	39.9
40 years and over	12.2	11.6	26.3
40-49	*n.p.*	13.1	33.3
50 years and over	*n.p.*	9.8	19.8

Notes:

n.p. Not available for publication but included in totals where applicable, unless otherwise indicated. In this case this is a result of low numbers being potentially identifying.

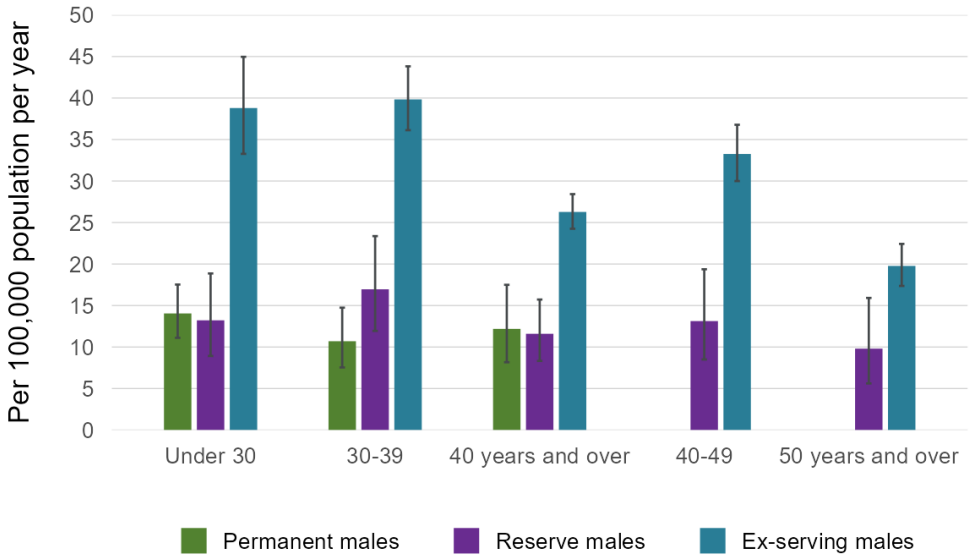
a. Due to the small number of suicide deaths among permanent males at the older ages, the upper age limit presented is 40 years and over.

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Due to low numbers of suicides among permanent males aged over 40, these values were aggregated into a single category (40 and over). The 40-49 and 50 and over figures are presented for reserve and ex-serving males.

Figure 7 below presents these values.

Figure 7: Male suicide rate by age group and service status, 1997–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Due to the small number of suicide deaths among females, suicide rates by age group and service status are not reported.

Data underlying this graph are available in supplementary table S4.1, S4.2, and S5.3. See Data for a link to the tables.

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Suicides by service

Suicides by service

The ADF comprises three services: the Royal Australian Navy (Navy), the Australian Army (Army) and the Royal Australian Air Force (Air Force). An individual may move between services over their career. Unless stated otherwise, the service recorded for ex-serving members is their service at their time of separation.

The majority of ex-serving members were in Army (68.4% for males and 62.3% for females). By contrast 16.1% of males and 18.0% of females were in Navy, and 15.5% of males and 19.7% of females were in Air Force.

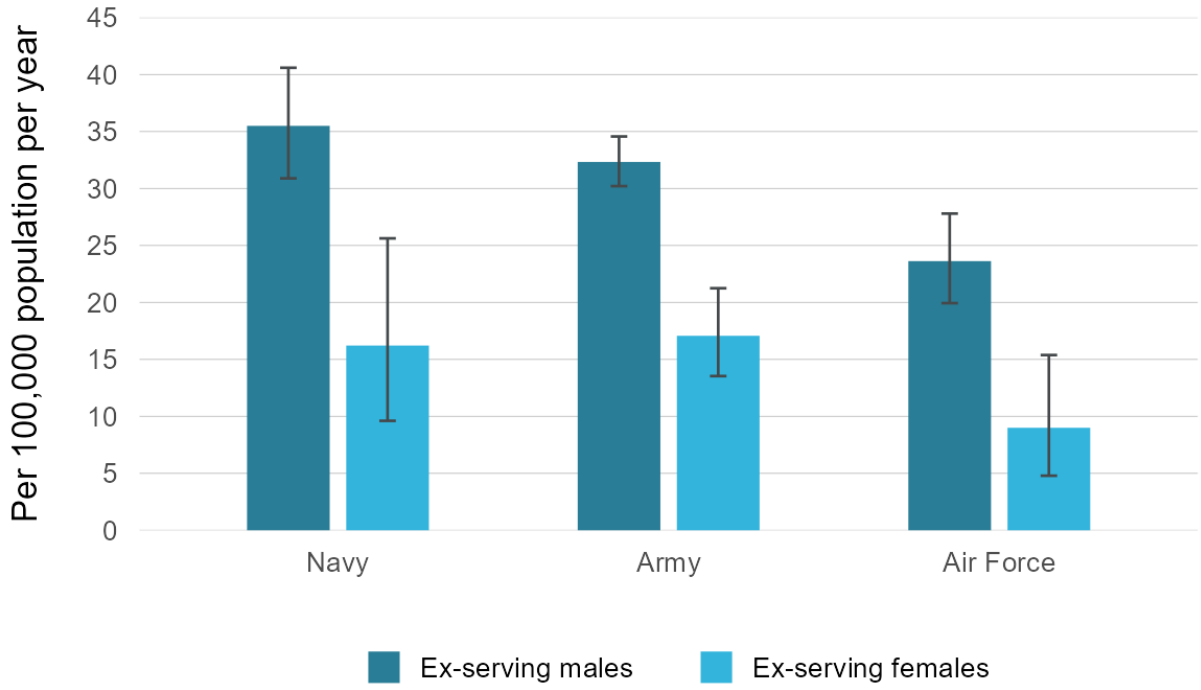
The rate of suicide for ex-serving males from Air Force was lower than for ex-serving from Army or Navy, as shown in Table 6 and Figure 8 below. However, the modelling section suggests that this difference no longer exists when other variables are controlled for (see Figure 18).

Table 6: Suicide rates by service, ex-serving males and females, 1997–2020

Service	Ex-serving males: Suicide rate per 100,000 population per year	Ex-serving females: Suicide rate per 100,000 population per year
Navy	35.5	16.2
Army	32.3	17.1
Air Force	23.6	9.0

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Figure 8: Suicide rate by service, ex-serving males and females, 1997–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

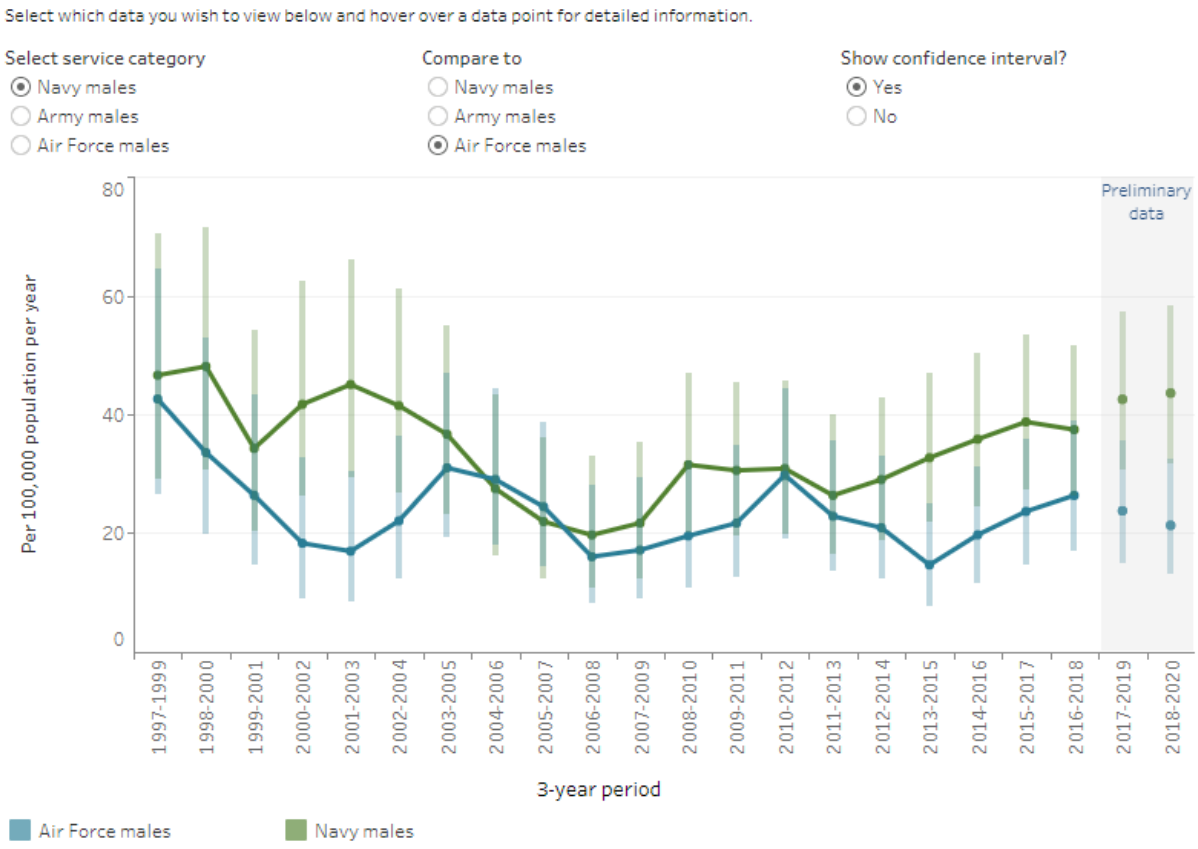
Suicide rate by service over time

The following graph (Figure 9[6]) shows how suicide rates for ex-serving males by service vary over time, in 3-year periods from 1997-1999 to 2018-2020. While there is some fluctuation, no statistically significant differences over time were detected. Small numbers mean challenges in detecting statistically significant differences.

Due to small number of suicide deaths among ex-serving females, suicide rates over time are not reported.

[6] This figure is a screenshot of an interactive figure, with the interactivity disabled. Screenshots of all selection options can be found in the Appendix. The full figure is available in the web report.

Figure 9: Rate of suicide for ex-serving males by service, 1997–1999 to 2018–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Note: The confidence intervals in this figure can be used to determine whether there is a statistically significant difference between the suicide rates calculated for the ADF between different 3-year periods. However, they cannot be used to determine whether there is a statistically significant difference between rates calculated for the ADF population for overlapping 3-year time periods (for example 2002–2004 and 2003–2005).

Data underlying this graph are available in Supplementary table S6.4. See Data for a link to the tables.

Please note, data for more recent years are subject to change; see the Technical notes for further detail.

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Suicides by reason for separation

The reasons that ADF members separate from the ADF can be categorised into four broad groups:

- Voluntary separation
- Involuntary separation for reasons other than medical (referred to as other involuntary separation)
- Involuntary medical separation
- Contractual or administrative change

The separation date used in this report is when a member leaves the ADF entirely, that is when they are no longer a permanent or reserve member. Separation reason is therefore the reason recorded for leaving their last engagement with the ADF.

Due to a change in the way the reason for separating the ADF was recorded in 2002, analysis is presently only reported for ADF members who separated from 1 January 2003 onwards. These members comprise 41% of the ex-serving cohort. Among this cohort:

- The most common type of reason for separation was voluntary separation, with the similar proportions for males and females (44.8% and 44.4% respectively).
- This was followed by other involuntary separation (males 30.4% and females 23.9%).
- Next was involuntary medical separation (males 14.6% and females 17.9%).
- For contractual or administrative changes these accounted for 10.3% of male separations, and 13.8% of female separations.

Between 2003 and 2020, the suicide rate for ex-serving males by reason for separation was lowest for those who separated either voluntarily or for contractual/administrative reasons (22.5 and 18.6 per 100,000 population per year respectively) and highest for those whose reason for separation was involuntary medical (69.8 per 100,000 population per year).
It should be noted that there was no statistical difference between the voluntary, other involuntary, and contractual/admin groups.

This is demonstrated in Table 7 below.

Table 7: Suicide rates by reason for separation, ex-serving males and females, 2003[(a)]–2020

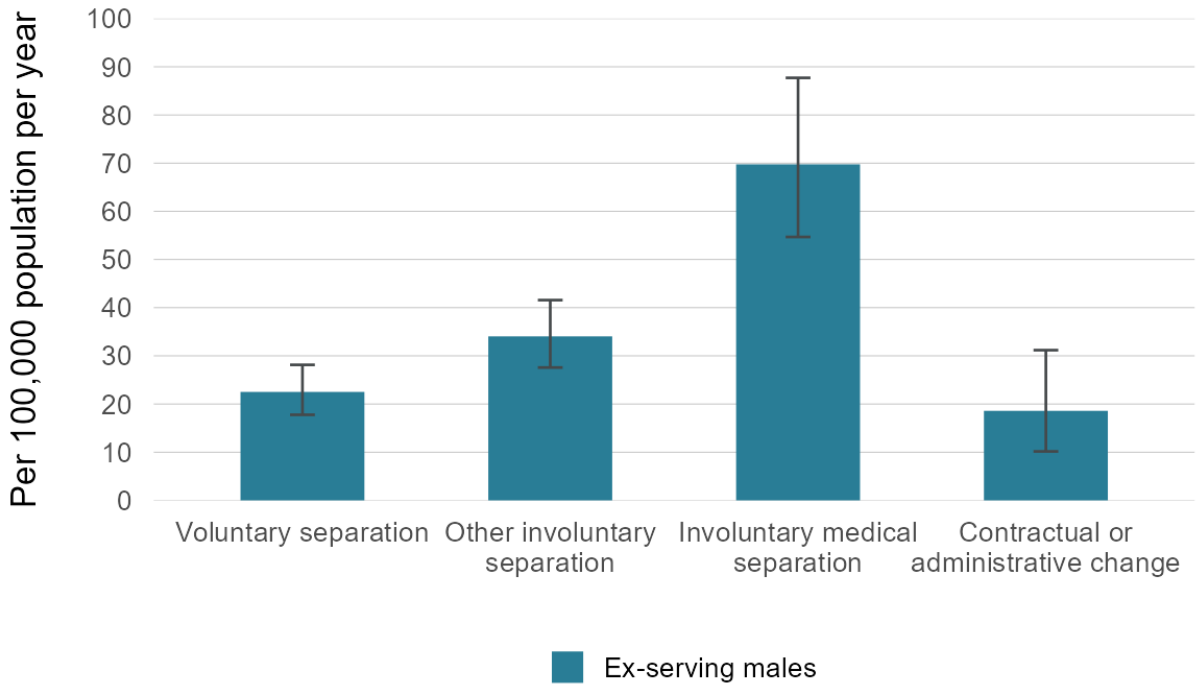
Reason for separation	Ex-serving males: Suicide rate per 100,000 population per year	Ex-serving females: Suicide rate per 100,000 population per year
Voluntary separation	22.5	18.3
Other involuntary separation	34.0	16.9
Involuntary medical separation	69.8	25.8
Contractual or administrative change	18.6	0

Note:

a. Due to a change in the way the reasons for separating the ADF was recorded during 2002, analysis is presented only for ADF members who left from 1 January 2003 onwards. These members comprise 41% of the total ex-serving members with at least 1 day of service since 1 January 1985.

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Figure 10: Suicide rates by reason for separation, ex-serving males, 2003–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

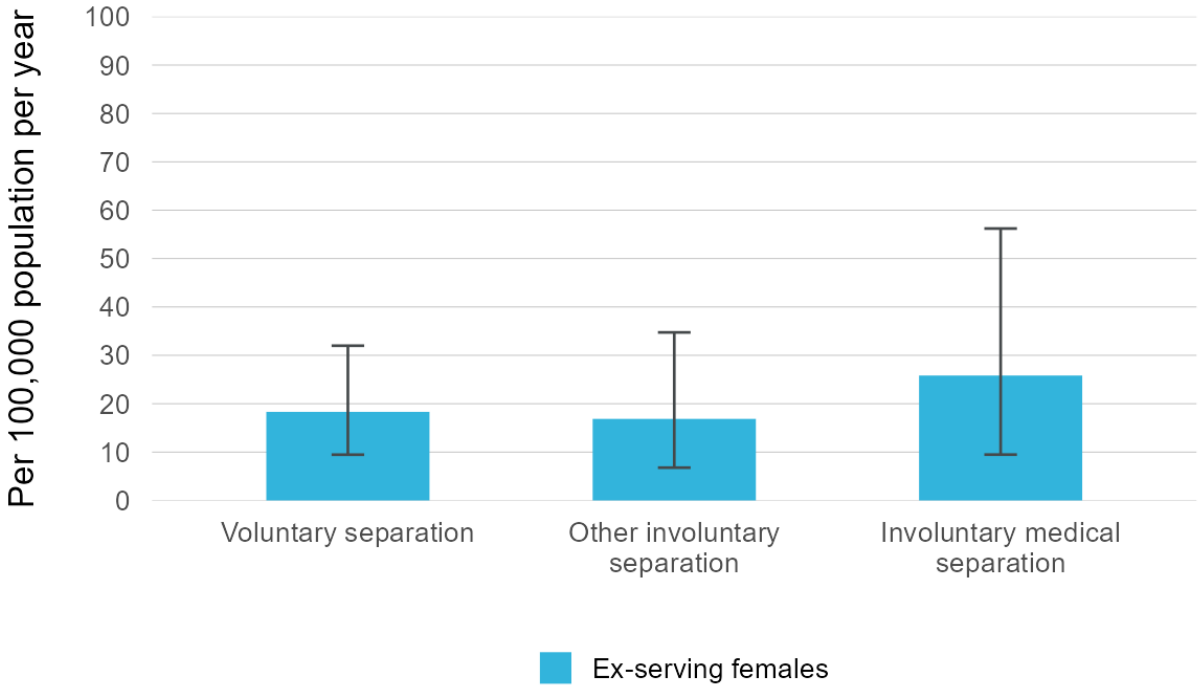
The age-adjusted analysis for the male voluntary and contractual/administrative separation cohorts indicates that there is no statistical difference in suicide rate between these cohorts and the Australian population. Similar analyses indicate that the involuntary separation cohorts have a higher rate of suicide than the Australian population, as seen in supplementary table S3.1.

Further work is underway to investigate the feasibility of comparing rates of suicide between the involuntary medical separation cohort and other appropriate alternative populations, such as people with similar medical conditions.

Between 2003 and 2020, the suicide rates for ex-serving females by reason for separation were statistically similar for voluntary separation, involuntary medical separation, and other involuntary separation (18.3, 25.8, and 16.9 per 100,000 population per year respectively).

Since there were no suicide deaths among ex-serving females who separated for contractual or administrative reasons this column does not appear in Figure 11 below. The wide confidence intervals due to low numbers make it difficult to comment with any more certainty.

Figure 11: Suicide rates by reason for separation, ex-serving females, 2003–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Due to the shortened period of usable data and overall low numbers the time series graphs for reason for separation will not be presented. Since these values are all statistically similar there are no comparisons given here with the Australian female population. The SMR for the overall ex-serving female cohort is given in the *Suicide by sex and service status group* section.

Data underlying these graphs are available in supplementary table S4.1 and 4.2 See Data for a link to the tables.

Please note, data for more recent years are subject to change; see the Technical notes for further detail.

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Suicides by length of service

Suicides by length of service

Length of service describes the time between joining the ADF and separation[7]. For suicide rates analysis in this report, length of service is presented in five groups (ranging from less than 1 year to more than 20 years).

The proportions of ex-serving males and females by varying length of service were as follows:

- 13.2% of males and 17.5% of females had served less than 1 year.
- 26.1% of males and 31.8% of females had between 1-<5 years of service.
- 18.0% of males and 21.1% of females had between 5-<10 years of service.
- 19.0% of males and 19.0% of females had between 10-<20 years of service.
- 23.0% of males and 10.1% of females having served 20 or more years.

The average length of service was higher for males than females (11.3 years and 7.9 years respectively).

Suicide rates for ex-serving males decreased as length of service increased. The suicide rate was lowest for males who served more than 20 years (16.5 per 100,000 population per year) and highest for those who had served less than one year (47.1 per 100,000 population per year). These are significantly different from the 1-<5, 5-<10 and 10-<20 categories, which are themselves statistically similar.

For ex-serving females, rates of suicide were statistically similar for all lengths of service. This is shown in Table 8 and Figure 12 below.

[7] Note that the separation point used in this study reflects full separation from the ADF – that is, when a member is no longer permanent or reserve. For example, a member who transfers from full time service to the standby reserves is not yet counted as having separated.

Table 8: Suicide rate by length of service, ex-serving members, 1997–2020

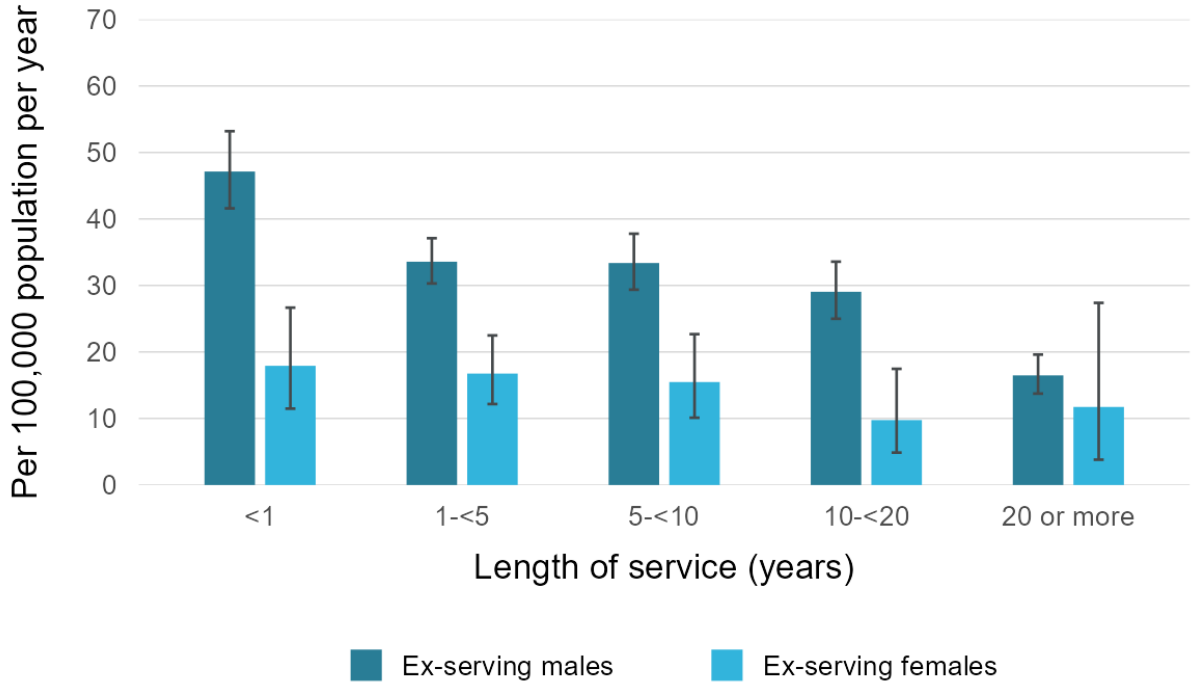
Length of service (years)[a]	Ex-serving males: Suicide rate per 100,000 population per year	Ex-serving females: Suicide rate per 100,000 population per year
<1	47.1	17.9
1-<5	33.6	16.8
5-<10	33.4	15.5
10-<20	29.1	9.8
20 or more	16.5	11.7

Note:

a. The time between the date of hire and date of separation from the ADF.

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Figure 12: Suicide rate by length of service, ex-serving males and females, 1997–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Suicide rate by length of service over time

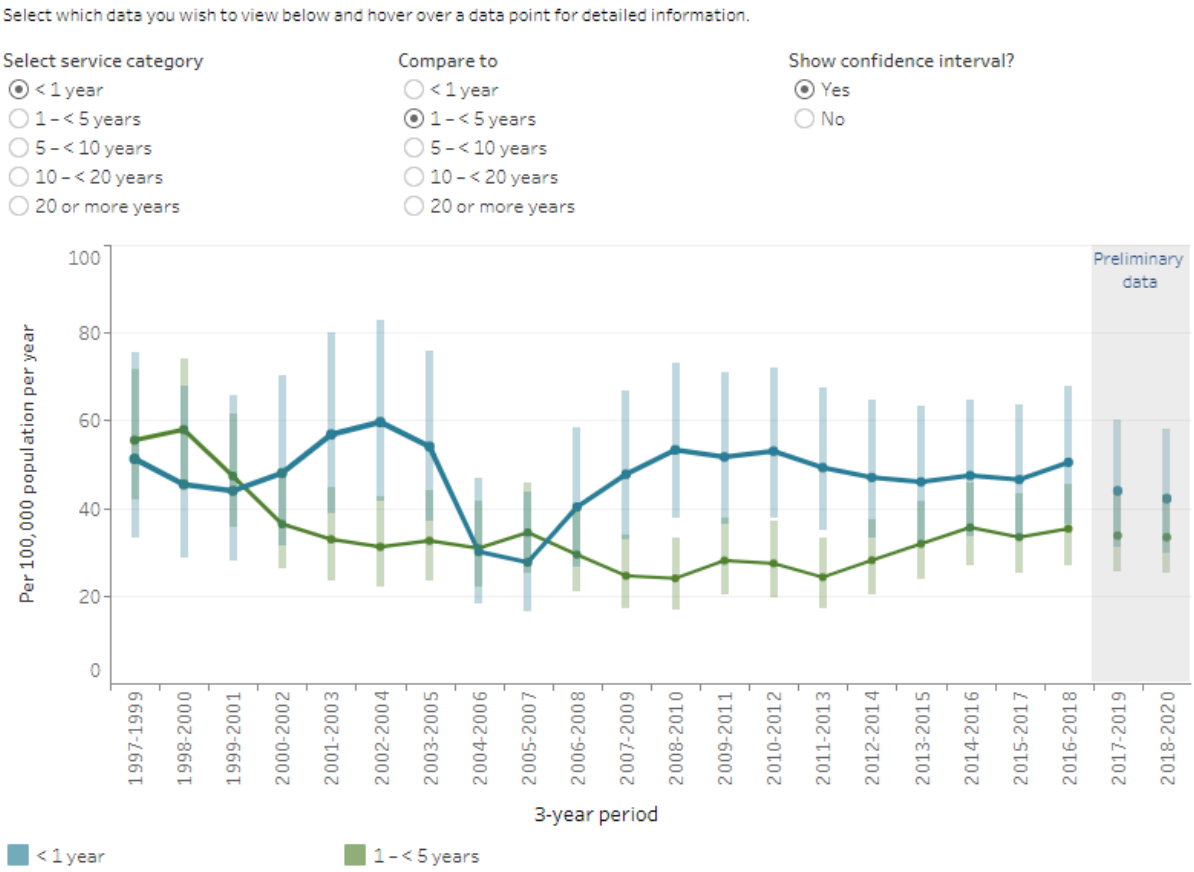
The suicide rates for ex-serving males by five length of service groups were relatively stable over time, apart from a large drop over the years 2004 to 2007 among the <1 year cohort. The reason for this is unknown and may be a result of low numbers. Nevertheless, this fluctuation in suicide rate was not statistically significant relative to the suicide rates over time.

Due to the small number of suicide deaths among ex-serving females, suicide rates by length of service over time are not reported.

The interactive graph below (Figure 13[8]) presents the suicide rates for ex-serving males in each of the length of service groups, for all 3-year periods from 1997-1999 to 2018-2020.

[8] This figure is a screenshot of an interactive figure, with the interactivity disabled. Screenshots of all selection options can be found in the Appendix. The full figure is available in the web report.

Figure 13: Rate of suicide for ex-serving males by length of service, 1997–1999 to 2018–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Note: The confidence intervals in this figure can be used to determine whether there is a statistically significant difference between the suicide rates calculated for the ADF between different 3-year periods. However, they cannot be used to determine whether there is a statistically significant difference between rates calculated for the ADF population for overlapping 3-year time periods (for example 2002–2004 and 2003–2005).

Data underlying this graph are available in supplementary table S6.6. See Data for a link to the tables.

Please note, data for more recent years are subject to change; see the Technical notes for further detail.

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Suicides by time since separation

Suicides by time since separation

For ex-serving members who have died by suicide, time since separation is the time between separation from the ADF[9] and date of death. In this report, time since separation is presented in five groups (ranging from less than 1 year to more than 20 years).

The proportions of the ex-serving cohort that fall into each time since separation category are:

- Around half (50.8% of males and 52.2% of females) separated from the ADF 20 or more years prior.
- Just under one quarter (23.1% of males and 23.2% of females) separated from the ADF between 10 and 20 years ago.
- Just over 1 in 10 (11.1% for males and 10.4% of females) separated from the ADF between 5 and 10 years ago.
- For males 12.8%, and for females 11.9% separated from the ADF between 1 and 5 years ago.
- Around 2.2% of males and 2.3% of females separated less than 1 year ago.

Table 9 below gives the suicide rates corresponding to these categories.

[9] Note that the separation point used in this study reflects full separation from the ADF – that is, when a member is no longer in permanent or reserve service.

Table 9: Suicide rate by time since separation, ex-serving males and females, 1997–2020

Number of years since separation[(a)]	Ex-serving males: Suicide rate per 100,000 population per year	Ex-serving females: Suicide rate per 100,000 population per year
<1	31.2	23.0
1-<5	33.3	12.0
5-<10	31.1	16.5
10-<20	31.8	15.3
20 or more[(b)]	30.1	15.3

Notes:

a. The period between separation date and extract date (31 December 2019) for those alive at the extract date. The period between separation date and death for ex-serving members who have died.

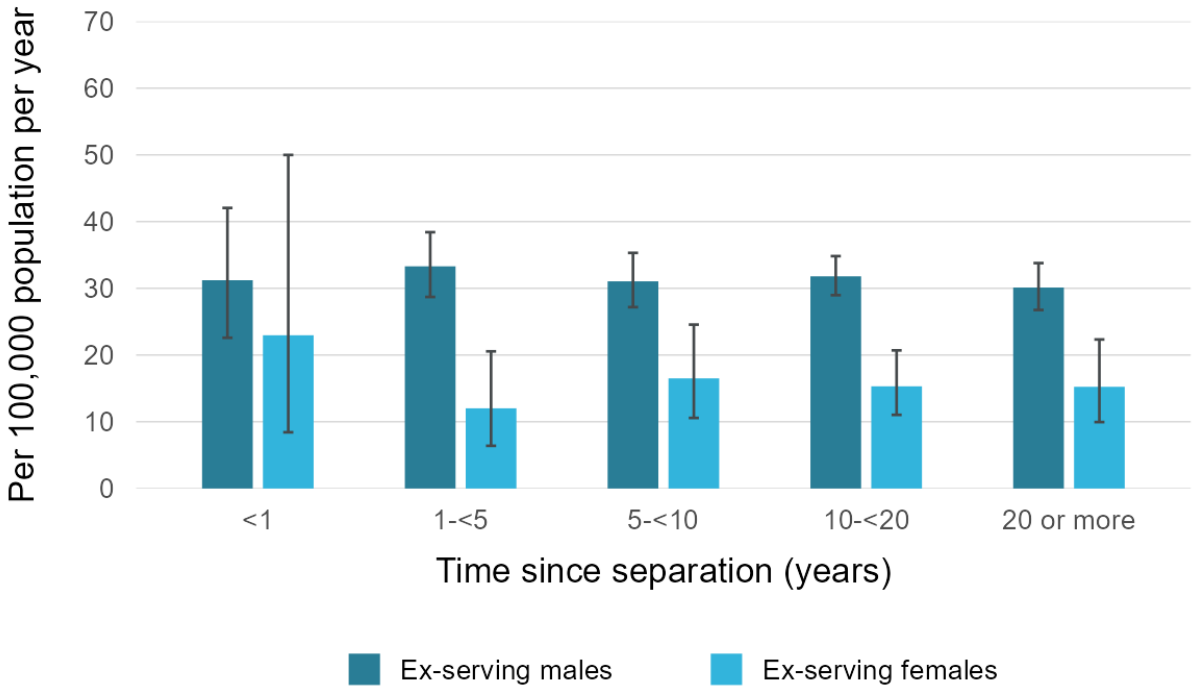
b. Due to the study population, suicide rates for time since separation 20 or more are from 2005–2020.

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

The average time since separation was close to 19 years, and was the same for males and females. The maximum length of time since separation observed in this study was 36 years.

The rates of suicide were similar regardless of time since separation for both ex-serving males and females, as demonstrated below in Figure 14.

Figure 14: Suicide rate by time since separation, ex-serving males and females, 1997–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Time since separation over time for ex-serving males

Suicide rates over time for ex-serving males by time since separation are presented in the interactive graph below. Note that due to small numbers of suicide deaths with less than one year since separation data are aggregated and presented for less than five years since separation.

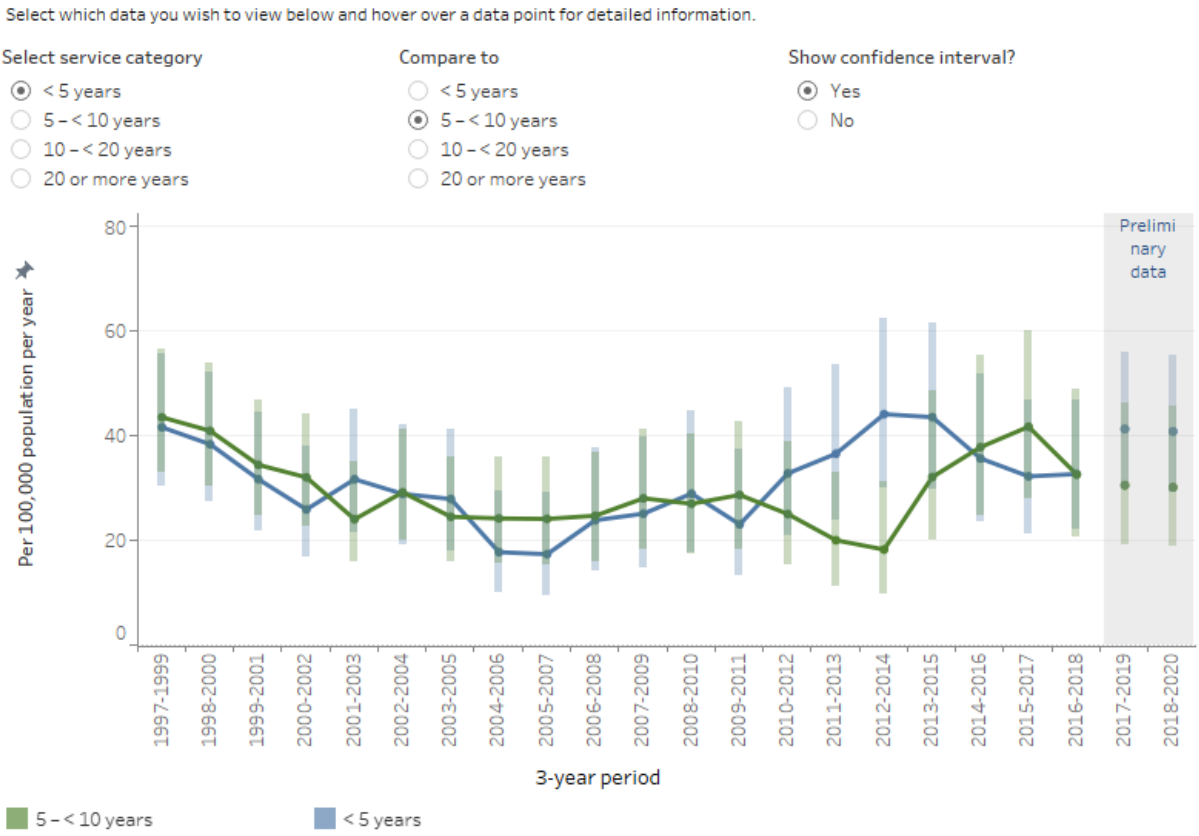
Due to the small number of suicide deaths among ex-serving females, suicide rates over time are not reported.

Although there has been some small variation in the suicide rates for individual groups over time, these variations were not significant.

The interactive graph below (Figure 15[10]) presents the suicide rates for ex-serving males in each of the time since separation groups for all 3-year periods from 1997-1999 to 2018-2020.

[10] This figure is a screenshot of an interactive figure, with the interactivity disabled. Screenshots of all selection options can be found in the Appendix. The full figure is available in the web report.

Figure 15: Rate of suicide for ex-serving males by time since separation, 1997–1999 to 2018–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Notes:

Due to the scope of the study population, suicide rates for time since separation 20 or more years are from 2005-2020.

The confidence intervals in this figure can be used to determine whether there is a statistically significant difference between the suicide rates calculated for the ADF between different 3-year periods. However, they cannot be used to determine whether there is a statistically significant difference between rates calculated for the ADF population for overlapping 3-year time periods (for example 2002–2004 and 2003–2005).

Data underlying this graph are available in supplementary table S6.7 See Data for a link to the tables.

Please note, data for more recent years are subject to change; see the Technical notes for further detail.

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Suicides by rank

Suicides by rank

Rank describes organisational and workforce structures that determine a member's position, conditions, opportunities, and entitlements (such as pay and conditions). This analysis is based on rank at time of separation. In previous reports, rank has been presented in two broad groups: commissioned officers and all ranks other than commissioned officer. In this report, ranks other than officer will be subcategorised into senior, and junior other ranks.

Around 86% of ex-serving males were in the other ranks group at time of separation, (71% were junior other ranks, and 16% were senior other ranks). For females, 86% of ex-serving members were in the other ranks group, (79% were junior other ranks, and 7% were senior other ranks). For both males and females 14% of the ex-serving cohort were officers.

The suicide rates for these groups are given in Table 10 below.

Table 10: Suicide rate by rank, ex-serving males and females, 1997–2020

Rank at time of separation	Ex-serving males: Suicide rate per 100,000 population per year	Ex-serving females: Suicide rate per 100,000 population per year
Commissioned officer[(a)]	16.3	12.4
Senior ranks other than commissioned officer[(b)]	19.6	14.7
Junior ranks other than commissioned officer[(c)]	36.4	15.8

Notes:

a. For the purposes of this analysis this is a Defence member who holds a rank of Midshipman or Officer Cadet, or higher.

b. A Defence member who holds an equivalent rank to E06 (Petty Officer, or Sergeant) to E10 (Warrant Officer of the Navy, Regimental Sergeant Major of the Army, or Warrant Officer of the Air Force).

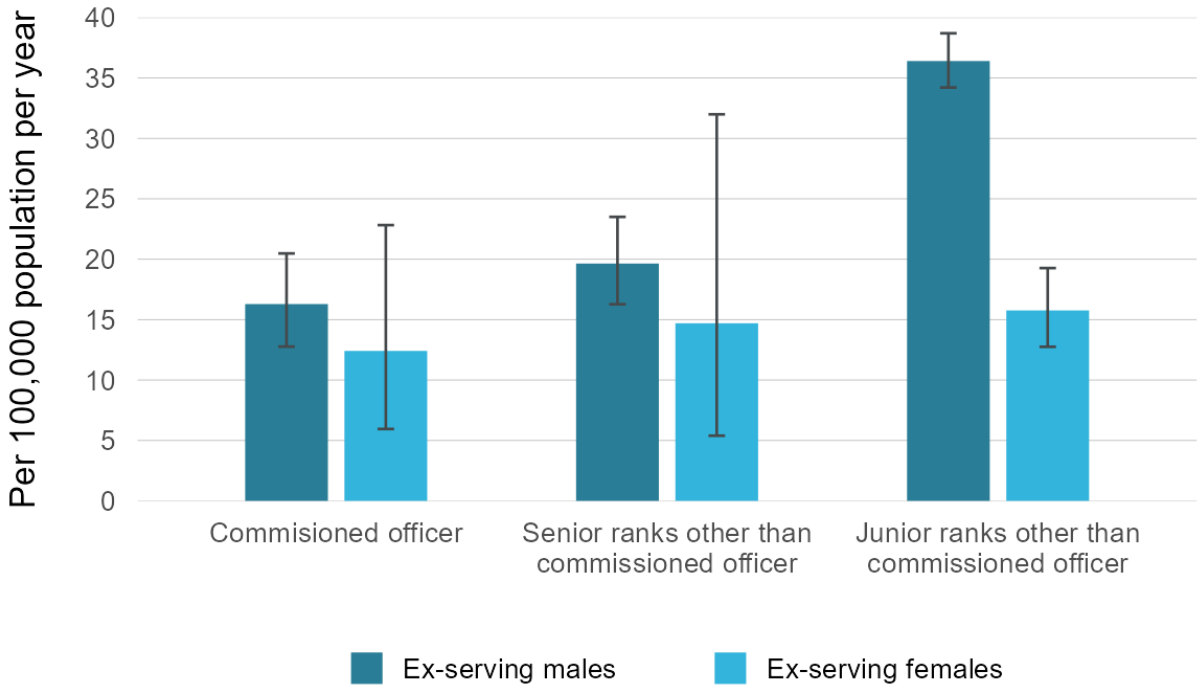
c. A Defence member who holds an equivalent rank to E00 (Recruit Seaman, Private, or Aircraftman) to E05 (Leading Seaman, or Corporal).

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Between 1997 and 2020, the suicide rates for ex-serving males who were commissioned officers or senior other ranks at the time of separation was approximately half that of those who were junior other ranks (16.3 and 19.6 respectively compared with 36.4 per 100,000 population per year).

For ex-serving females, rates of suicide were similar for commissioned officers, and senior and junior other ranks (grouped close between 12 and 16 per 100,000 population per year). This is shown in Figure 16 below.

Figure 16: Suicide rate by rank, ex-serving males and females, 1997–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Suicide rate by rank over time

Rates of suicide for ex-serving males who separated as junior other ranks shows a drop between the late 1990s and the mid 2000s, which is consistent with patterns observed in the general Australian male population over this period (see Figure 3).

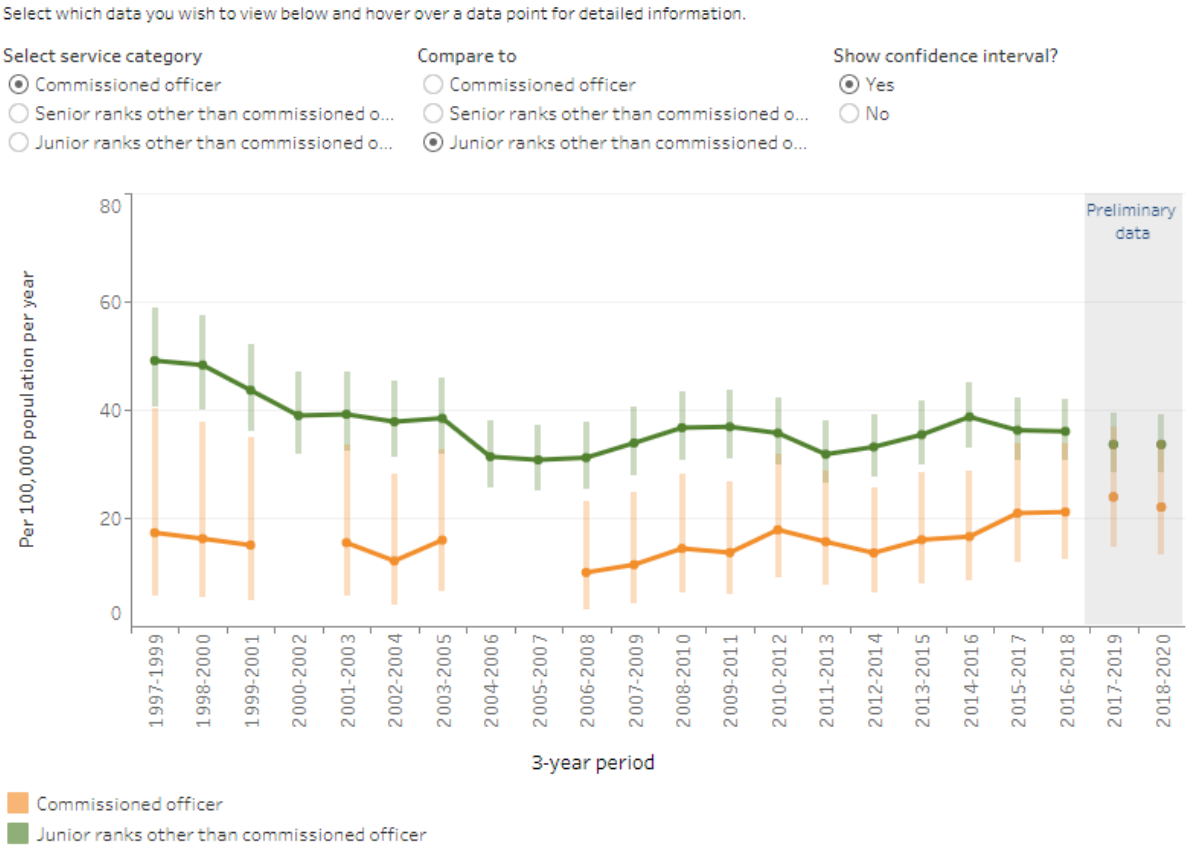
Analysis of suicide rates among commissioned officers is based on a small number of suicide deaths. Results have not been reported where there were less than five suicides in the 3-year periods, 2004 to 2006 and 2005 to 2007. Similarly, the 3-year period 2001 to 2003 for senior other ranks has been suppressed for the same reason.

Due to small numbers of suicide deaths among ex-serving females, suicide rates by rank over time are not reported.

The interactive graph below (Figure 17[11]) presents the suicide rates for ex-serving males in each of the rank groups, for all 3-year periods from 1997-1999 to 2018-2020.

[11] This figure is a screenshot of an interactive figure, with the interactivity disabled. Screenshots of all selection options can be found in the Appendix. The full figure is available in the web report.

Figure 17: Rate of suicide for ex-serving males by rank, 1997–1999 to 2018–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Note: The confidence intervals in this figure can be used to determine whether there is a statistically significant difference between the suicide rates calculated for the ADF between different 3-year periods. However, they cannot be used to determine whether there is a statistically significant difference between rates calculated for the ADF population for overlapping 3-year time periods (for example 2002–2004 and 2003–2005).

Data underlying this graph are available in Supplementary table S6.5. See Data for a link to the tables.

Please note, data for more recent years are subject to change; see the Technical notes for further detail.

If you need help or support, please contact:
Open Arms - Veterans and Families Counselling **1800 011 046**
Open Arms Suicide Intervention page
Defence All-hours Support Line (ASL) **1800 628 036**
Defence Member and Family Helpline **1800 624 608**
Defence Chaplaincy Support **1300 333 362**
ADF Mental Health Services
Lifeline **13 11 14**
Suicide Call Back Service **1300 659 467**
Beyond Blue Support Service **1300 22 4636**

For information on support provided by DVA, see:
Mental health support services
Free mental health care for veterans

Modelling suicide rates over time

Summary of key findings

Cox proportional hazards modelling was carried out to see which service-related factors were most strongly associated with suicide death in the ex-serving ADF population over time when all other available factors are accounted for.

Results show that the following service-related characteristics were associated with significantly higher or lower instantaneous rates (meaning the rates at any instant) of suicide among the ex-serving population, holding all other available factors constant:

- Those aged 50 and over have a hazard ratio of 0.6 compared to those who are 30-39 years old. This implies a lower rate of suicide for those ages 50 and over: that is 0.6 times the suicide rate for those aged 30-39 years. For more information on how to interpret hazard ratios see Box 3.
- Those who are female have a lower (0.5 times) rate of suicide compared to those who are male.
- Those who are commissioned officers at the time of separation have a lower (0.7 times) rate of suicide compared to those who are of other ranks other than commissioned officers.
- Those who have served for less than 1 year have a higher (1.6 times) rate of suicide compared to those who have served for 10 or more years.
- Those who have left for involuntary medical reasons have a higher (2.8 times) rate of suicide compared to those who left voluntarily.
- Service (Navy, Army, Air Force) was not found to be a statistically significant predictor of suicide once all other factors were controlled for.

These results indicate that the rate of suicide is lower in those who are over 50 years of age, female, commissioned officers, have served for 10 or more years, and left voluntarily.

While these results can identify groups of people who have a higher rate of suicide, they cannot indicate if any specific characteristic is the reason for a suicide death. There is limited data on the sequencing of factors/exposures that can contribute to suicide death. Qualitative analysis methods may provide insight into the circumstances leading up to suicide death.

Introduction to modelling suicide rates

The 2021 suicide monitoring report, *Serving and ex-serving Australian Defence Force members who have served since 1985: suicide monitoring 2001 to 2019,* and the analyses of the previous chapters, used univariate analysis to report the rates of suicide. This approach is somewhat limited in that the different variables must be looked at in isolation.

In this chapter Cox proportional hazards modelling is used to identify and compare interactions between variables. This multi-factor analysis compliments the trends and conclusions observed above or in previous reports, providing further insight into the factors associated with suicide while independently confirming previous analyses.

Cox proportional hazards survival modelling for ex-serving members

Cox proportional hazard modelling was used to perform survival modelling analyses where the occurrence of suicide was monitored once an individual has separated from the ADF. Since separation from the ADF marks the entry of an individual into this model it does not account for permanent or reserve members, only ex-serving. See the Technical notes for a deeper discussion of this technique.

Two models are presented, the first for ex-serving members who separated on or after 1 January 1997, while analysing the variables: age group, sex, rank, service, and length of service.

The second model contains all ex-serving members who separated on or after 1 January 2003 and will assess reason for separation alongside: age group, sex, rank, and length of service. This model is interested specifically in reason for separation, so the monitoring period was restricted the post-2003 cohort (which has accurate separation data).

Note that senior and junior other ranks were merged into an “other ranks” category and length of service groups were aggregated into <1, 1-10, and 10 or more groups. This was done to maximise the population numbers within these subgroups, for more robust statistical analyses.

Also note that the distinction between permanent ex-serving and reserve ex-serving did not satisfy the proportional hazards assumption (see Box 3), as the suicide rates for these cohorts get closer together with time. Therefore, this could not be included.

Box 3: Interpretation of hazards ratios in survival modelling

The modelling results are expressed as hazard ratios (HR), which in this context represents the multiplicative difference in instantaneous rate of suicide between two groups within a variable while holding all other analysed variables constant. Groups within a variable are compared to a reference group which was nominated to be the most populous subgroup for each variable. Hazard ratios are assumed to be constant over time (this is the **proportional hazards assumption**) and variables for which this is not so are excluded.

To elaborate, for two groups within a variable, Group A and Group B, where Group A is the reference group, and Group B is the study group, if the HR = 2, this can be interpreted as: individuals in Group B have double the rate of death by suicide at every instant compared to individuals in Group A at any given time over the course of the model, holding all other analysed covariates constant. HRs are multiplicative across the model variables.

At any point during the monitoring period:

- A group with HR > 1 suggests an increased rate of suicide relative to the reference group while holding all other variables constant.
- A group with HR < 1 suggests a decreased rate of suicide relative to the reference group while holding all other variables constant.
- A group with HR = 1 suggests no difference rate of suicide relative to the reference group while holding all other variables constant.

The 95% confidence intervals (CI) for each HR are provided where HRs are considered significant difference to the reference group if the 95% CI does not contain the value 1.

Suicide monitoring by survival modelling: 1997–2020

This analysis contains all ex-serving members of the ADF who separated on or after 1 January 1997 and models the rate of suicide over time across the variables:

- age group
- sex
- rank
- service
- length of service.

Time since separation is excluded since it represents the time variable of the model itself (measuring the time between separation from the ADF and death by suicide). As such it cannot be included for analysis.

The reference groups for comparison were selected to be those that were most populous within each variable over the model period. These were 30-39 years of age, male, ranks other than officer, Army, and 10 or more years length of service.

While holding all other analysed variables constant, the instantaneous rate of suicide in the ex-serving population at any point between 1997-2020 was:

- 0.6 times in those aged 50 and over compared to those who are 30-39 years old.
- 0.5 times in those who are female compared to those who are male.
- 0.7 times in those who are commissioned officers compared to those who are of ranks other than commissioned officers.
- 1.6 times in those who served for less than 1 year compared to those who have served for 10 or more years.

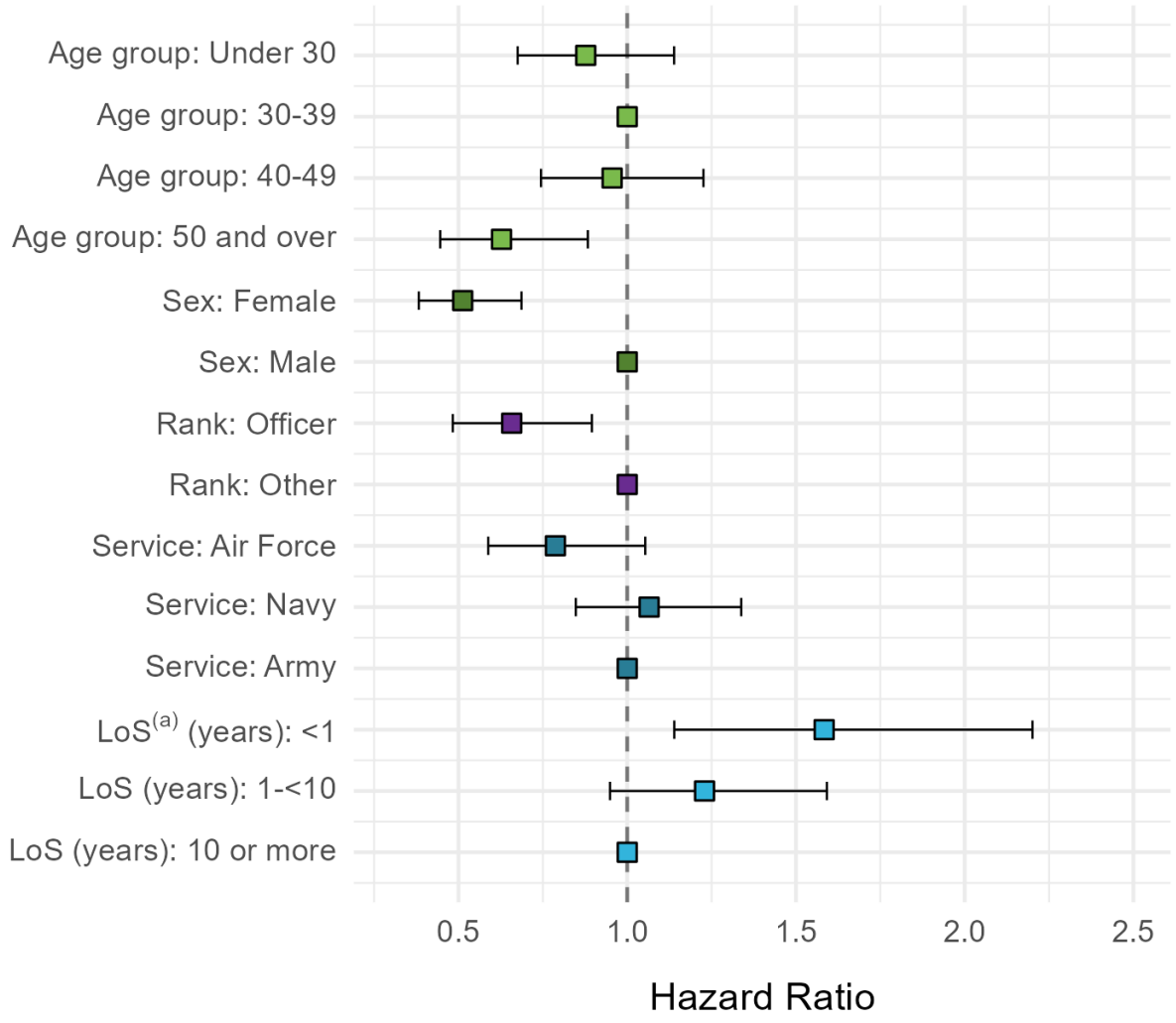
Service was not found to be a statistically significant predictor of suicide once all other factors were controlled for. The model outputs are given in full in Table 11, and Figure 18 below.

Table 11: Hazard ratios for suicides over time of the ex-serving population: 1997–2020, by survival modelling

Variable	Reference	Study group	Hazard ratio	Lower 95% CI	Upper 95% CI	Significant difference to reference
Age group (years)	30-39	Under 30	0.9	0.7	1.1	No
		40-49	1.0	0.7	1.2	No
		50 and over	0.6	0.4	0.9	Yes, Lower
Sex	Male	Female	0.5	0.4	0.7	Yes, Lower
Rank	Other	Officer	0.7	0.5	0.9	Yes, Lower
Service	Army	Air Force	0.8	0.6	1.1	No
		Navy	1.1	0.8	1.3	No
Length of service (years)	10 or more	<1	1.6	1.1	2.2	Yes, Higher
		1-<10	1.2	0.9	1.6	No

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Figure 18: Hazard ratios for suicides over time of the ex-serving population: 1997–2020, by survival modelling



Note:

a. LoS is Length of service

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Suicide monitoring by survival modelling with reason for separation: 2003–2020

This analysis contains all ex-serving members of the ADF who separated on or after 1 January 2003, and models rate of suicide over time across the variables:

- separation reason
- age
- sex
- rank
- length of service.

The reference groups for comparison were again selected to be those that were most populous over the model period within each variable. These were 30-39 years of age, male, ranks other than officer, voluntary separation, and 10 or more years length of service. Since this model contains fewer people than the 1997-2020 one, results for variables other than reason for separation should not be taken as more meaningful here. For example, there is insufficient evidence to conclude that the introduction of reason for separation as a variable renders age no longer significant.

While holding all other analysed variables constant, the rate of suicide for people who separated from the ADF for involuntary medical reasons at any point between 2003-2020 is 2.8 times compared to those separated voluntarily.

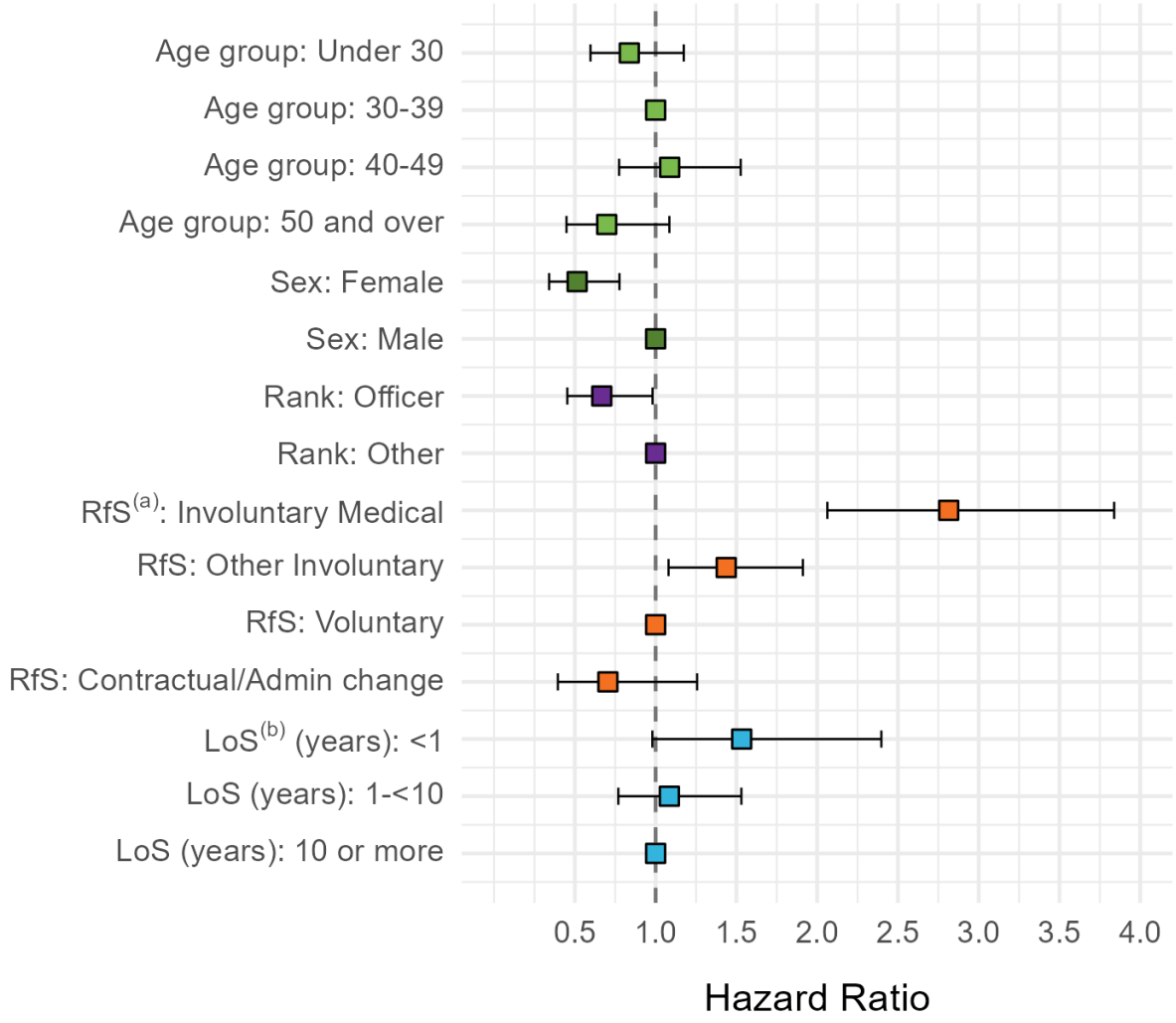
These results are given in detail below (see Table 12 and Figure 19).

Table 12: Hazard ratios for suicides over time of the ex-serving population: 2003–2020, by survival modelling

Variable	Reference	Study group	Hazard ratio	Lower 95% CI	Upper 95% CI	Significant difference to reference
Age group (years)	30-39	Under 30	0.8	0.6	1.2	No
		40-49	1.1	0.8	1.5	No
		50 and over	0.7	0.4	1.1	No
Sex	Male	Female	0.5	0.3	0.8	Yes, Lower
Rank	Other	Officer	0.7	0.5	1.0	Yes, Lower
Reason for separation	Voluntary	Involuntary Medical	2.8	2.1	3.8	Yes, Higher
		Involuntary Other	1.4	1.1	1.9	Yes, Higher
		Contractual or administrative change	0.7	0.4	1.3	No
Length of service (years)	10 or more	<1	1.5	1.0	2.4	No
		1-<10	1.1	0.8	1.6	No

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Figure 19: Hazard ratios for suicides over time of the ex-serving population: 2003–2020, by survival modelling



Notes:

a. RfS is Reason for separation

b. LoS is Length of service

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

This result confirms that involuntary medical separation is a significant risk factor for suicide even when accounting for the other model variables.

Data underlying this graph are available in Supplementary table S8.1-S8.6. See Data for a link to the tables.

Please note, data for more recent years are subject to change; see the Technical notes for further detail.

If you need help or support, please contact:
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Open Arms Suicide Intervention page
Defence All-hours Support Line (ASL) **1800 628 036**
Defence Member and Family Helpline **1800 624 608**
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ADF Mental Health Services
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Suicide Call Back Service **1300 659 467**
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For information on support provided by DVA, see:
Mental health support services
Free mental health care for veterans

Psychosocial risk factors

Summary

This section presents information on risk factors for permanent, reserve and ex-serving ADF members who died by suicide, including psychosocial, natural disease and mental and behavioural disorder risk factors. Analysis of risk factors among deaths by suicide in the Australian population are presented here as a reference point. However, direct comparisons should be made with caution due to the limitations in the coding of risk factors in ADF and Australian populations. Further information can be found in the Technical notes.

The key findings in this section reveal that psychosocial risk factors were the most common type of risk factor identified among ADF males and females who died by suicide, followed by mental and behavioural disorders and natural disease.

Further, the three most common risk factors for ADF males and females who died by suicide were:

- Mood (affective) disorders (for example, depression) were the most commonly identified risk factor for ADF members who died by suicide.
- Problems in spousal relationship circumstances and suicide ideation, were the second and third most commonly identified risk factors for ADF males who died by suicide.
- Personal history of self-harm and problems in spousal relationship circumstances were the second and third most commonly identified risk factors for ADF females who died by suicide.

Background

It is widely acknowledged that suicide is affected by a complex interaction of factors over the course of an individual's lifetime. Broadly, these can include biological (such as disease or injury), psychological (such as mental ill-health or substance abuse disorders) and psychosocial factors (such as family and education history) (ABS 2019). 'While there is uncertainty about the extent of causation between psychosocial factors and suicide, it is generally accepted that having this information allows for further public health responses to suicide prevention' (ABS 2019).

Psychosocial risk factors are not routinely certified or captured in mortality coding, yet this information is clearly highly informative in suicide prevention efforts. This information not being routinely available is a construct of using the legal death certification for mortality coding, which only lists diagnosable conditions, diseases and external events causing injury. However, coroner referred death investigations (which include suicide) provide a wealth of information which is captured in the National Coronial Information System (NCIS) for deaths registered since July 2000 (January 2001 for Queensland cases). Using the NCIS, the ABS can supplement the standard death certificate information with psychosocial factors to create an enhanced mortality dataset (ABS 2019).

For the current study, the AIHW commissioned the ABS to identify and code information from the NCIS (using International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)) to capture psychosocial risk factors for ADF members who died by suicide between 1 January 2001 and 31 December 2020 and who had at least one day of service from 1 January 1985[12]. As the NCIS only includes a nationally complete set of records from 1 January 2001 onwards, the ABS coding was limited to deaths after 1 January 2001.

Capturing information on risk factors relating to deaths by suicide can highlight areas of a person's life experience that may need additional attention to provide the most effective suicide prevention interventions. However, it is important to note that the presence of one or more of these risk factors in an individual's life does not necessarily mean they will have suicidal behaviours. The vast majority of people who have these risk factors will not experience suicidal behaviours.

What is a psychosocial risk factor?

The ABS define psychosocial risk factors as 'social processes and social structures which can have an interaction with individual thought or behaviour and health outcomes' (ABS 2019). Examples of psychosocial factors include relationship status, employment status, bereavement, contact with the legal system and educational outcomes.

The ABS coded psychosocial risk factors for ADF members and Australians who died by suicide using the International Statistical Classification of Diseases and Related Health Problems (ICD-10) codes Z00-Z99 (see Technical notes for more information)[13].

Natural disease, as defined by the ABS, includes 'all disease and health related conditions with the exclusion of mental and behavioural disorders, injuries, and external causes' (ABS 2019). These correspond with the ICD 10 codes A00-E90, G00-R99, U071-U072, and U08-U09, with some exclusions (see Technical notes).

Mental and behavioural disorder risk factors are recorded with ICD-10 codes F00-F99 (ABS 2019). A disorder refers specifically to 'a clinically recognizable set of symptoms or behaviours associated in most cases with distress and with interference with personal functions' (WHO 1992).

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[12] The NCIS was established in 2000 and contains information on coroner referred deaths registered since 1 July 2000 for all Australian States and Territories except Queensland which commenced on 1 January 2001 (NCIS n.d.).

[13] In 2020, the ABS added codes to associated causes of death coding for the capture of the COVID-19 pandemic as a risk factor based on how it was described as part of the coronial investigation: F41.8 Pandemic-related anxiety and stress; Z29.0 Isolation or quarantine (hotel or home), and Z29.9 Prophylactic measures put in place through health directives for pandemic response, including closure of business and stay at home measures.

Psychosocial or other risk factors should not be considered in isolation (ABS 2021b). The factors that can lead someone to suicide can be complex and often involve a mixture of causal and circumstantial risk factors. A combination of factors can contribute to increased risk. Further, a presence of protective factors may reduce the risk of suicide. (Open Arms 2019).

Box 4: Concepts of mortality and causes of death

Deaths in Australia are recorded under certain processes and conventions, this is particularly relevant in understanding the analysis of deaths by suicide risk factors presented in this section. The following briefly introduces two key concepts:

Concept: type of deaths

All causes of death can be grouped to describe the type of death, whether it be from a disease or condition, or from an injury, or whether the cause is unknown. These are generally described as: natural causes, external causes and unknown causes. In particular, deaths by natural causes include deaths due to diseases (such as diabetes, cancer, heart disease etc.) and mental and behavioural disorders (such as depression, anxiety) (ABS 2018).

Concept: underlying and multiple causes of death

There are multiple causes of death recorded on an individual's death certificate and rules applied to select an underlying cause of death. The underlying cause of death is defined as 'the disease or injury that initiated the train of morbid events leading directly to death'. Accidental and violent deaths are classified according to the external cause, that is, to the circumstances of the accident or violence which produced the fatal injury rather than to the nature of the injury sustained.

Multiple causes of death include all causes and conditions reported on the death certificate (that is both underlying and associated causes). As all entries on the death certificate are taken into account, multiple causes of death analysis (such as in this section) are valuable in recognising the impact of factors which are less likely to be an underlying cause, highlighting relationships between concurrent processes, and giving an indication of injuries which occur as a result of specific external events (ABS 2018).

Risk factors and deaths by suicide

Risk factors for Australian males and females who died by suicide are presented with those for ADF members to highlight risk factors that may be specific to ADF members. However, direct comparisons of prevalence should be made with caution due to the limitations in the coding of risk factors in ADF and Australian populations. Further information can be found in the Technical notes. Risk factors are presented for Australian males and females who died by suicide where the death was registered in 2018 (sourced from the National Mortality Database (NMD)), as data from more recent years have a greater proportion of coronial cases remaining open and not yet able to be fully coded for risk factors (see Technical notes). For the data presented, the age range of the Australian population was restricted to the minimum and maximum ages of the ADF population (for permanent, reserve, or ex-serving males and females respectively, age at death ranges from 17 to 78, and 22 to 70).

Risk factors captured in the coding depend on available information. How comprehensively the risk factors experienced by an individual are captured in the coding may vary for different

individuals, jurisdictions and cohorts[14]. While coding risk factors, ABS allocated ADF members a specific code which is not used in the Australian population cause of death coding to capture 'Defence force related deployment' (see Technical notes for further information).

Risk factors may have been present at any point of the life of an ADF member, including before, during or after ADF service. Risk factors identified for ADF members who died by suicide may or may not be directly related to ADF service.

Figure 20[15] presents the proportion of male and female ADF members who died by suicide (between 1 January 2001 and 31 December 2020) and Australian males and females who died by suicide (registered in 2018) who had at least one risk factor. It should be noted that the female ADF cohort is smaller than that for males and in general, suicide rates for ADF females are lower. Due to the small numbers of suicides for ADF females, female ADF comparisons should be interpreted with caution.

The median age at death for ADF members who died by suicide between 1 January 2001 and 31 December 2020, included in this analysis, was 40 for ADF males and 41 for ADF females. When restricting the age at death range to the relevant ADF populations, the median age for those who died by suicide in the Australian population (registered in 2018) was 43 for males and 45 for females.

Psychosocial risk factors were the most common type of risk factor identified among ADF males and females who died by suicide, followed by mental and behavioural disorders and natural disease.

- 80% of male ADF members who died by suicide had at least one reported psychosocial risk factor. Of Australian males who died by suicide, 74% had at least one psychosocial risk factor.
- 53% of male ADF members who died by suicide had at least one reported natural disease. Of Australian males who died by suicide, 56% had at least one reported natural disease.
- Over 8 in 10 (84%) female ADF members who died by suicide had at least one psychosocial risk factor. Of Australian females who died by suicide, 7 in 10 (71%) had at least one psychosocial risk factor.
- 64% of female ADF members who died by suicide had at least one natural disease. Of Australian females who died by suicide, 58% had at least one natural disease.

[14] The coding of risk factors 'does not necessarily reflect all causes associated with all suicides that have occurred' (ABS 2021b) as it is only able to capture those risk factors that arose and were documented in the coronial process, and available in coronial reports at the time the data was coded. In addition, there is no national standard for the collection of data on psychosocial factors—each state and territory have their own legislation and processes relating to coroner-certified deaths meaning that the type of information collected and held by the NCIS database differs slightly by jurisdiction.

[15] This figure is a screenshot of an interactive figure, with the interactivity disabled. Screenshots of all selection options can be found in the Appendix. The full figure is available in the web report.

Figure 20: Proportion of ADF males and females who died by suicide, 2001–2020, and Australian males and females who died by suicide, 2018, with at least one risk factor

Notes:

Includes ADF members who died by suicide, between 2001 and 2020, and identified in the NCIS. Five ADF member suicides during this period were not matched to coronial records and are excluded from the analysis, see Technical notes for more information. Where an ADF member's death was registered in 2019 and 2020, the causes of death are still subject to revision and the proportion of risk factors present may increase after revision.

Includes data for Australians who died by suicide, that were registered in 2018. Analysis was based on final data for 2018 deaths registrations; therefore, totals may differ from coronial data published by the ABS based on preliminary or revised data. Data includes 90 deaths by suicide which were registered in Victoria in 2018 but were not supplied to the ABS until 2019 due to an issue associated with the Victorian Registry's previous processing system. The causes of death information for these cases are considered revised, not final. The age range of Australians who died by suicide was restricted to match the ADF member cohort (for permanent, reserve, or ex-serving males and females respectively, age at death ranges from 17 to 78, and 22 to 70).

Data in this figure indicate the number or proportion of deaths by suicide with each specified risk factor. Risk factors may not be mutually exclusive, and therefore people with multiple factors recorded may be counted in more than one category.

Continued

Figure 20 (continued): Proportion of ADF males and females who died by suicide, 2001–2020, and Australian males and females who died by suicide, 2018, with at least one risk factor

Notes:

Mental and behavioural disorder includes ICD-10 codes F00-F99.

Natural disease includes all disease and health related conditions with the exclusion of mental and behavioural disorders, injuries, and external causes. ICD-10 codes A00-E90, G00-R99, U071-U072, and U08-U09, excluding some terminal conditions G93, J96, I46, I49, R688, R57, R58.

Psychosocial risk factors correspond to codes ICD-10 codes Z00-Z99. For a list of psychosocial risk factors, refer to explanatory note Annex listing: Psychosocial codes (exclusions and inclusions) in Psychosocial risk factors as they relate to coroner-referred deaths in Australia (cat. No. 1351.0.55.062) (ABS 2019).

'Any associated cause' refers to having at least one reported 'Mental and behavioural disorder', 'Natural disease', or 'Psychosocial risk factor'. The ABS coded risk factors of ADF member suicides based on the International Classification of Diseases.

Risk factors and service-related characteristics

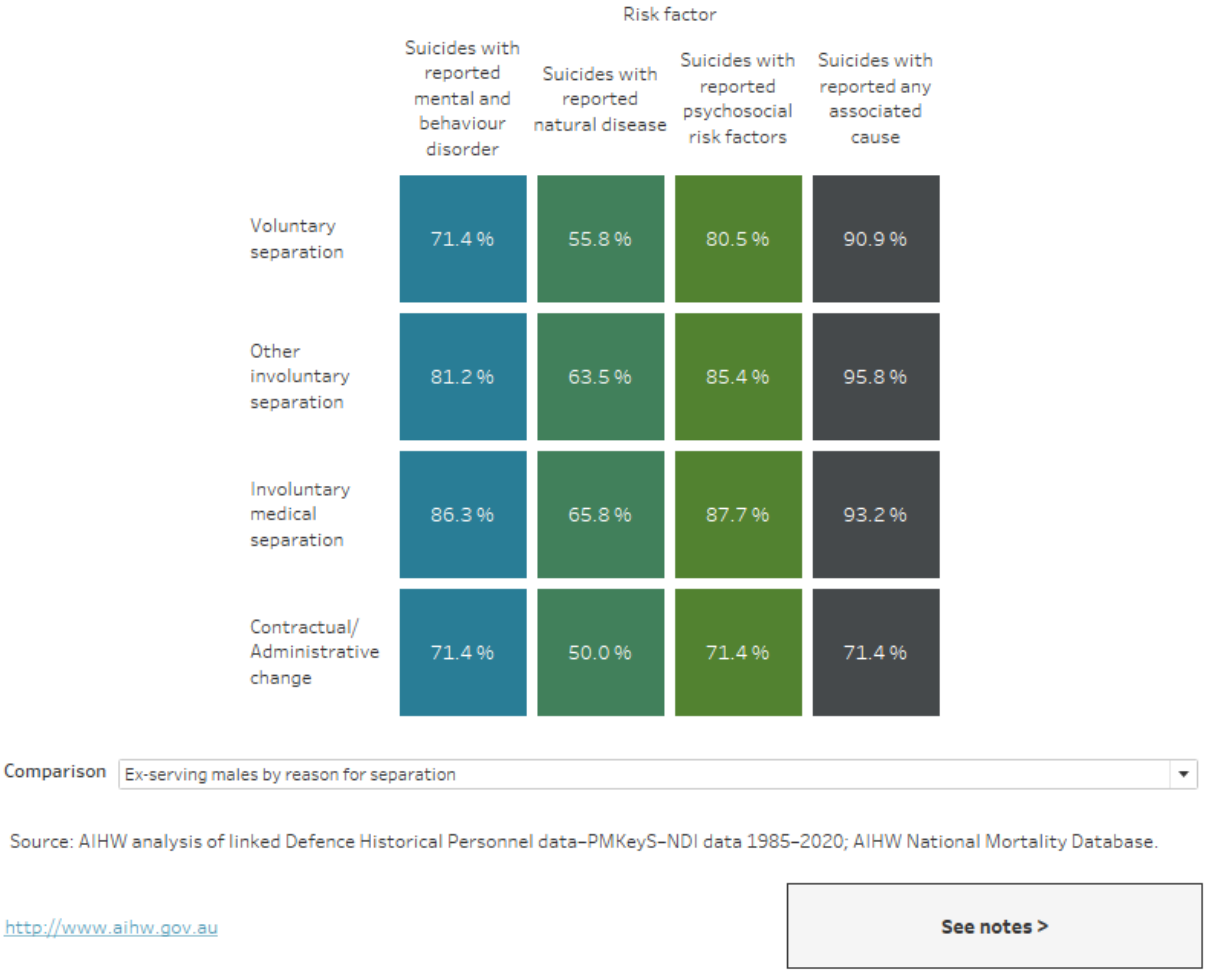
Figure 21[16] provides proportions for ADF males (permanent, reserve and ex-serving) who died by suicide (between 1 January 2001 and 31 December 2020) by service-related characteristics and risk factors. Information is presented by service status, prior service status, service, length of service, time since separation, rank and reason for separation. Due to the small number of deaths by suicide among females, service-related characteristics by risk factors are not reported for female ADF members.

Figure 21 shows that for ex-serving ADF males:

- 89% of those who died within less than one year of separating from the ADF had at least one psychosocial risk factor, in contrast between 73% to 82% of those who died by suicide one or more years after separating from the ADF had at least one psychosocial risk factor.
- Of those who separated for involuntarily medical reasons, nearly 9 in 10 (88%) had a psychosocial risk factor, more than 8 in 10 (86%) were identified as having a mental and behavioural disorder risk factor, and over 6 in 10 (66%) had a natural disease risk factor.

[16] This figure is a screenshot of an interactive figure, with the interactivity disabled. Screenshots of all selection options can be found in the Appendix. The full figure is available in the web report.

Figure 21: Proportion of male ADF members who died by suicide with at least one risk factor, by service-related characteristics, 2001–2020



Notes:

Includes ADF members who died by suicide, 2001 to 2020, able to be identified in the NCIS. Five ADF member suicides during this period were not matched to coronial records and are excluded, see Technical notes for more information. Where an ADF member's death was registered in 2019 and 2020, the causes of death are still subject to revision and the proportion of risk factors present may increase after revision.

Data in this table indicate the number or proportion of deaths by suicide with each specified risk factors. Risk factors may not be mutually exclusive, and therefore people with multiple factors recorded may be counted in more than one category.

Mental and behavioural disorder includes ICD-10 codes F00-F99.

Natural disease includes all disease and health related conditions with the exclusion of mental and behavioural disorders, injuries, and external causes. ICD-10 codes A00-E90, G00-R99, U071-U072, and U08-U09, excluding some terminal conditions G93, J96, I46, I49, R688, R57, R58.

Psychosocial risk factors correspond to codes ICD-10 codes Z00-Z99. For a list of psychosocial risk factors, refer to explanatory note Annex listing: Psychosocial codes (exclusions and inclusions) in Psychosocial risk factors as they relate to coroner-referred deaths in Australia (cat. No. 1351.0.55.062).

Continued

Figure 21 (continued): Proportion of male ADF members who died by suicide with at least one risk factor, by service-related characteristics, 2001–2020

Notes:

'Any associated cause' refers to having at least one reported 'Mental and behavioural disorder', 'Natural disease', or 'Psychosocial risk factor'. The ABS coded risk factors of ADF member suicides based on the International Classification of Diseases.

Prior service status, time since separation, and separation reason are presented for ex-serving ADF members only.

For prior service status, ex-serving ADF members are subcategorised into those who have had any previous record of permanent service and those who have had only record of reserve service. Sum of component items do not equal totals, as there were a total of 5 ex-serving ADF males who had died by suicide where history of prior service status could not be determined.

Length of service is calculated as the time between the date of hire and date of separation from the ADF. Sum of component items do not equal totals, as there were a total of 7 members who had died by suicide who did not have a hire date.

Time since separation is calculated as the period between separation date and reference date (31 December 2020) for those alive at the reference date. It is calculated as the period between separation date and death for ex-serving members who have died.

Due to a change in the way the reasons for separating the ADF was recorded during 2002, analysis of separation is presented only for ADF members who left from 1 January 2003 onwards.

Common risk factors among ADF member and Australian suicides

Figure 22[17] presents the most commonly recorded risk factors among male and female ADF members (1 January 2001–31 December 2020) and male and female Australians (registered in 2018) who died by suicide. It should be noted that the female ADF cohort is smaller than that for males and in general suicide rates for ADF females are lower. Therefore, female ADF comparisons should be interpreted with caution.

Figure 22 shows that:

- Mood (affective) disorders (including depression) were the most commonly identified risk factor for ADF females (66%) and ADF males (49%) and Australian females (56%) and Australian males (46%) who died by suicide.
- Around 4 in 10 of ADF males (41%) and ADF females (38%) who died by suicide were identified as having problems in spousal relationship circumstances.
- Among ADF members who died by suicide, personal history of self-harm was the second most common risk factor for females (38%) and the fifth most common for males (27%).
- Problems related to employment and unemployment were among the six most common risk factors for ADF females (27%) and ADF males (24%).

[17] This figure is a screenshot of an interactive figure, with the interactivity disabled. Screenshots of all selection options can be found in the Appendix. The full figure is available in the web report.

Figure 22: Common risk factors identified among ADF males and females who died by suicide, 2001–2020, and Australian males and females who died by suicide, 2018

Notes:

Includes ADF members who died by suicide, 2001 to 2020, able to be identified in the NCIS. Five ADF member suicides during this period were not matched to coronial records and are excluded, see Technical notes for more information. Where an ADF member's death was registered in 2019 and 2020, the causes of death are still subject to revision and the proportion of risk factors present may increase after revision.

Includes data for Australians who died by suicide, that were registered in 2018. Analysis was based on final data for 2018 deaths registrations, therefore, totals may differ from coronial data published by the ABS based on preliminary or revised data. Data includes 90 deaths by suicide which were registered in Victoria in 2018 but were not supplied to the ABS until 2019 due to an issue associated with the Victorian Registry's previous processing system. The causes of death information for these cases are considered revised, not final. The age range of Australians who died by suicide was restricted to match the ADF member cohort (for permanent, reserve, or ex-serving males and females respectively, age at death ranges from 17 to 78, and 22 to 70).

Continued

Figure 22 (continued): Common risk factors identified among ADF males and females who died by suicide, 2001–2020, and Australian males and females who died by suicide, 2018

Data in this figure indicate the number or proportion of deaths by suicide with each specified risk factor. Risk factors may not be mutually exclusive, and therefore people with multiple factors recorded may be counted in more than one category. Risk factors are ordered from 1 = most common risk factor present, to 6 = 6th most common risk factor present.

ICD-10 codes for the risk factors are as follows: Mood [affective] disorders (F30-F39), Problems in spousal relationship circumstances (Z630, Z635), Suicide ideation (R458), Acute alcohol use and intoxication (F100, R780, T51 excludes cases with an underlying cause of death of X60-X65), Personal history of self-harm (Z915), Problems related to employment and unemployment (Z56), Acute psychoactive substance use and intoxication (F1[1-9]0, R781-R789), Anxiety and stress related disorders (Z733, F40-F48 excludes F418, F454), Chronic psychoactive substance abuse disorders (D521, D590, D592, D611, D642, E064, E160, E231, E242, E273, E661, F111-F119, F121-F129, F131-F139, F141-F149, F151-F159, F161-F169, F181-F189, F191-F199, G211, G240, G251, G254, G256, G444, G620, G720, I952, J702, J703, J704, L105, L270, L271, M102, M320, M804, M814, M835, M871), Chronic alcohol abuse disorders (E244, G312, G621, G721, I426, K292, K70, K860, F101-F109). Acute alcohol use can affect a death due to suicide in a number of ways including causing respiratory depression (especially when used in combination with other drugs) or affecting judgement and decision-making processes.

Common risk factors and service-related characteristics

Figure 23[18] presents proportions of ADF males who died by suicide (between 1 January 2001 and 31 December 2020), by service-related characteristics and most common risk factors. Information is presented by service status, prior service status, service, length of service, time since separation, rank and reason for separation. Due to the small number of deaths by suicide among ADF females, service-related characteristics by most common risk factors are not reported for female ADF members. (Figure 23 below is a screenshot of an interactive figure, with the interactivity disabled. The full figure is available in the web report.)

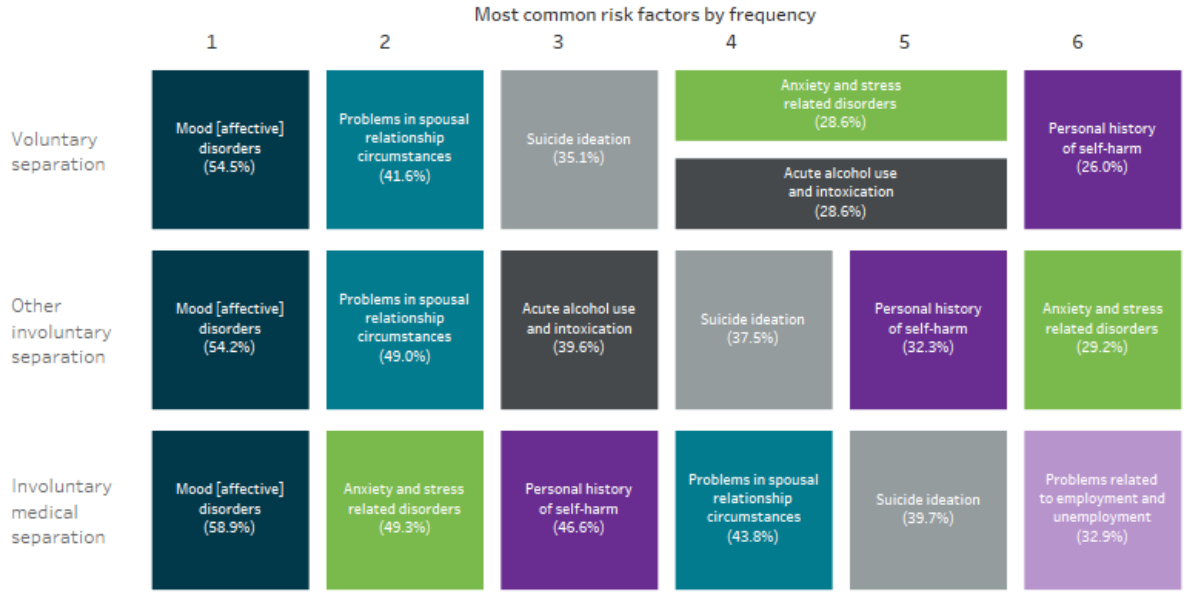
Figure 23 shows that:

- Across all three services (Navy, Army and Air Force), mood (affective) disorders were the most commonly identified risk factor for ADF males who died by suicide.
- Almost 5 in 10 of all reserve and ex-serving ADF males (49% for both), and over 4 in 10 permanent ADF males (45%) who died by suicide experienced mood (affective) disorders.
- Almost 5 in 10 (49%) of ex-serving ADF males who separated for involuntarily medical reasons had recorded anxiety and stress related disorders (including post-traumatic stress disorder (PTSD)). This compared to around 3 in 10 (29%) of ex-serving ADF males who separated for other involuntary or voluntary reasons[19].

[18] This figure is a screenshot of an interactive figure, with the interactivity disabled. Screenshots of all selection options can be found in the Appendix. The full figure is available in the web report.

[19] The higher proportion of anxiety and stress related disorders (including PTSD) among ex-serving ADF males who separated for involuntarily medical reasons may reflect that these disorders were related to the reason for involuntary medical separation.

Figure 23: Common risk factors identified among ADF males who died by suicide, 2001–2020, by service-related characteristics



Notes:

Includes ADF members who died by suicide, 2001 to 2020, able to be identified in the NCIS. Five ADF member suicides during this period were not matched to coronial records and are excluded, see Technical notes for more information. Where an ADF member's death was registered in 2019 and 2020, the causes of death are still subject to revision and the proportion of risk factors present may increase after revision.

Data in this figure indicate the number or proportion of deaths by suicide with each specified risk factor. Risk factors may not be mutually exclusive, and therefore people with multiple factors recorded may be counted in more than one category. Risk factors are ordered from 1 = most common risk factor present, to 6 = 6th most common risk factor present.

Prior service status, time since separation, and separation reason are presented for ex-serving ADF members only.

For prior service status, ex-serving members are subcategorised into those who have had any previous record of permanent service and those who have had only record of reserve service. Sum of component items do not equal totals, as there were a total of 5 ex-serving male members who had died by suicide where history of prior service status could not be determined.

Length of service is calculated as the time between the date of hire and date of separation from the ADF. Sum of component items do not equal totals, as there were a total of 7 members who had died by suicide who did not have a hire date.

Time since separation is calculated as the period between separation date and reference date (31 December 2020) for those alive at the reference date. It is calculated as the period between separation date and death for ex-serving members who have died.

Continued

Figure 23 (continued): Common risk factors identified among ADF males who died by suicide, 2001–2020, by service-related characteristics

Due to a change in the way the reasons for separating the ADF was recorded during 2002, analysis of separation is presented only for ADF members who left from 1 January 2003 onwards.

ICD-10 codes for the risk factors are as follows: Mood [affective] disorders (F30-F39), Problems in spousal relationship circumstances (Z630, Z635), Acute alcohol use and intoxication (F100, R780, T51 excludes cases with an underlying cause of X60-X65), Suicide ideation (R458), Problems related to employment and unemployment (Z56), Personal history of self-harm (Z915), Anxiety and stress related disorders (Z733, F40-F48 excludes F418, F454), Other problems related to psychosocial circumstances (Z655-Z659). Acute alcohol use can affect a death due to suicide in a number of ways including causing respiratory depression (especially when used in combination with other drugs) or affecting judgement and decision-making processes.

Sources: AIHW analysis linked Defence historical personnel data–PMKeyS–NDI data–coded NCIS data 1985–2020; AIHW National Mortality Database.

Data underlying these figures with additional information are available in Supplementary table S9.1-S9.6. See Data for a link to the tables.

Please note, data for more recent years are subject to change; see the Technical notes for further detail.

If you need help or support, please contact:
Open Arms - Veterans and Families Counselling **1800 011 046**
Open Arms Suicide Intervention page
Defence All-hours Support Line (ASL) **1800 628 036**
Defence Member and Family Helpline **1800 624 608**
Defence Chaplaincy Support **1300 333 362**
ADF Mental Health Services
Lifeline **13 11 14**
Suicide Call Back Service **1300 659 467**
Beyond Blue Support Service **1300 22 4636**

For information on support provided by DVA, see:
Mental health support services
Free mental health care for veterans

Frequently asked questions

1. What is the AIHW report: *Serving and ex-serving Australian Defence Force members who have served since 1985 suicide monitoring: 1997 to 2020*?

The *Serving and ex-serving Australian Defence Force members who have served since 1985: suicide monitoring 1997 to 2020* report is a statistical report that presents both counts and incidence rates of suicides for members of the ADF who have at least one day of service between 1 January 1985 and 31 December 2020, with the suicides monitored over the period 1 January 1997 to 31 December 2020. Information in the report is presented by age, sex, rank, length of service, time since separation and reason for separation.

2. What is new in the most recent edition of this report, compared with past releases?

The previous edition included members with at least one day of ADF service between 1 January 1985 and 31 December 2019 with a suicide monitoring period between 1 January 2001 and 31 December 2019. The current report expands on this earlier work by including members with at least one day of ADF service between 1 January 1985 and 31 December 2020 with suicide monitoring period from 1 January 1997 to 31 December 2020. This larger monitoring period enables more robust statistics and greater insight into the risk and protective factors for suicide within the permanent, reserve and ex-serving populations.

3. Why is the count of ex-serving suicides in 2022 report different from the 2021 report?

An additional 327 suicide deaths are reported here compared with the 2021 report. The breakdown of changes in the number of suicide deaths reported is as follows:

- 241 suicide deaths between 1997 and 2000 in members who separated between 1 January 1985 and 31 December 2001 (and were therefore previously out of scope)
- 79 suicide deaths that occurred in 2020
- 7 additional suicide deaths identified in 2019 due to a lag in reporting cause of death
- 7 additional suicide deaths identified in 2010 (2), 2014 (2), and 2018 (3) due to newly identified linkages
- 6 fewer deaths in 2008 (1), 2011 (1), 2012 (1), 2014 (2) and 2015 (1) due to the omission of Defence Suicide Database identified deaths (see Data Sources for further information)
- 2 fewer deaths in 2007 (1) and 2015 (1) due to updates in cause of death information in the NDI
- 1 additional suicide that occurred between 2001 and 2007 that was previously not reported where precise date of death year was not recorded in the NDI

The suicide monitoring period has been expanded to include those who died between 1997 and 2000, and has resulted in a corresponding increase in the number deaths by suicide reported (i.e. the 241 above). It is important to understand that this increased suicide count does not reflect a higher rate of suicide among the veteran population. Rather, the number of deaths by suicide identified has increased because more now fall within the monitoring

period. The rates of suicide amongst serving and ex-serving members of the ADF remain largely consistent between this report and ones previously published.

Care should be taken in comparing data in this report with previous AIHW publications. When comparing the results published here to those released in earlier updates it is more useful to focus on suicide rates, as these give a better indication of the risk of suicide to different groups within the ADF population.

4. Which populations are studied in this report?

This report uses information from the Defence Personnel Management Key Solution (PMKeyS) which started on 1 January 2001 together with a range of Defence historical personnel systems used prior to 2001 to develop a list of all members who had served at least one day since 1 January 1985. This is then linked to the National Death Index. Deaths are reported from 1 January 1997 to 31 December 2020.

5. Why are suicide rates only reported from 1997 onwards?

Suicide rates are not provided prior to 1997 due to data in the NDI being incomplete or otherwise unusable before this date, meaning the linkage between the Defence personnel data and the deaths data is liable to miss deaths. As such it was deemed unworkable to extend the death analysis earlier than 1997 for population analysis study purposes.

6. Why does the ADF population only include those with ADF service from 1 January 1985 onwards?

Due to limitations in historical Department of Defence personnel records, the study population does not include ADF members with service prior to 1 January 1985.

7. Why is there a two-year lag in suicide data?

The assembling and national reporting of deaths by suicide has up to a two-year time lag. Deaths that are referred to a coroner (including deaths by suicide) can take time to be fully investigated by the relevant State or Territory jurisdiction. To account for this, all coroner-certified deaths registered after 1 January 2006 are subject to a revisions process. This allows cause of death for open coroner's cases to be included at a later stage where the case is closed during the revision period. Cause of death data compiled by the ABS are deemed preliminary when first published, with revised and final versions of the data being historically published 12 and 24 months after initial processing.

8. What is the definition of veteran for this report?

A person who is serving or has served at least one day in the ADF since 1 January 1985.

9. How do ADF rates of suicide compare to the Australian population?

Overall, males serving in a permanent capacity and males in the reserves are about half as likely to die by suicide as Australian males.

Ex-serving ADF members are at a higher risk of suicide than Australian males though this group is not homogeneous, with likely other factors contributing to differing rates of suicide for subpopulations.

Notably, ex-serving males who separate for voluntary reasons are no more likely to die by suicide than the general Australian male population. Those ex-serving males who separate involuntarily are more likely to die by suicide than the Australian population.

Compared with the Australian population, suicide rates (after adjusting for age) between 1997 and 2020 were: 49% lower for male permanent ADF members; 46% lower for reserve ADF males; 27% higher for ex-serving ADF males; and 107% (or 2.07 times) higher for ex-serving ADF females.

10. Why are some ADF sub-groups compared to the Australian population and others are not?

To understand whether ADF members have differing characteristics and experiences as well as risk factors for suicide, it is important to compare them with the general Australian population. It is also important to note the ADF population age and sex demographics is different from the Australian population[20] and may be a contributing factor to observed differences.

These age and sex differences are considered when examining differences in suicide levels between these populations, and comparisons are presented where these differences are controlled. In this report comparisons to the Australian population are presented for analysis of ADF sub-groups of age, sex, service status (permanent, reserve and ex-serving), and reason for separation.

There are measures under study which are less meaningful when compared with Australian population due to underlying factors such as service (Army, Navy, Air Force), rank, length of service and time since separation. For these ADF sub-groups this study compares them to categories within the same sub-group (e.g. Army is compared with Navy and Air Force).

A potential area for future study would be to compare subpopulations of interest to more appropriate alternative populations, for instance, comparing involuntary medical separations to people with similar medical conditions. These analyses are currently out of scope for this report series.

11. Who are the 'at-risk' groups in the ADF population?

The ‘at-risk’ groups are those who had a higher rate of suicide than other ADF groups: higher rates were associated with ex-serving members who left involuntarily, were aged under 50 years, separated at junior other ranks, and had served for less than one year. In particular, the suicide rate of males who left for involuntary medical reasons was three times higher than those who separated voluntarily (69.8 compared with 22.5 per 100,000 population per year in ex-serving males).

[20] To illustrate, the permanent, reserve and ex-serving ADF populations have different age structures with median ages of 31, 37 and 51 years respectively compared with 38 years for the Australian population. While the permanent, reserve and ex-serving populations are 84% male, and the Australian population is 50% male.

12. Why did the modelling chapter only consider ex-serving members?

The Cox proportional hazards model considered separation from the ADF to be the beginning of a member's time spent in the model. This is because suicide rates for members before separation is substantially lower than after. Therefore, including serving members in the model alongside the ex-serving would mean having very statistically distinct groups being modelled at the same time which would confuse the results.

Future analysis will investigate the feasibility of modelling the serving cohort separately from the ex-serving cohort.

13. How do ADF rates of suicide compare to international military and defence forces?

The following is sourced from the Phoenix Australia *Defence Force Suicides Literature Review (July 2020)*.

For serving defence force members there is evidence from the United Kingdom (UK) and New Zealand that corresponds with Australian evidence that suicide rates are lower amongst current serving military members than in the general population, though this is not universal. In Canada, Germany and the United States (US), evidence suggests that rates of suicide amongst current serving soldiers are equivalent to or higher than those in the general population, with younger soldiers and those serving in the Army at particular risk.

For ex-serving defence force members, in concurrence with evidence from Australia, rates from the US and Canada suggest that ex-serving defence members are at higher risk of dying by suicide than the general population, though this is not universal. The UK, the Netherlands, and to an extent Sweden are notable in that suicide mortality was lower for ex-serving military than in the general population.

Technical notes

Population and expanded suicide monitoring period

The population used in this report includes all ADF members who have served at least one day since 1 January 1985. As of 31 December 2020, almost 379,000 Australians had served at least one day in the ADF between 1 January 1985 and 31 December 2020. Of these, just over 362,000 were still alive, comprising 60,000 permanent, 39,000 reserve, and 263,000 ex-serving.

Since 1985, the ex-serving population with at least one day of service since 1 January 1985 has increased each year as permanent and reserve ADF members separate. At the end of 1985, almost 6,100 members had separated and by the end of 2020 this had grown to 277,000. Due to the method used to assemble the study population, as members leave the permanent and reserve service, they are counted as members of the ex-serving study population until they die.

The previous version of the report included ADF members who had served at least one day since 1 January 1985 with a suicide monitoring period of 1 January 2001 to 31 December 2019 with rates of suicide reported from 1 January 2002 to 31 December 2019. This discrepancy was due to data quality concerns in the national deaths index (NDI) data pre-2001. However, after further investigations it was determined that it was analytically sound to extend the monitoring period from 1 January 1997 to 31 December 2020. Concerns about NDI completeness prevent accurate detection via linkage of deaths by suicide before 1997.

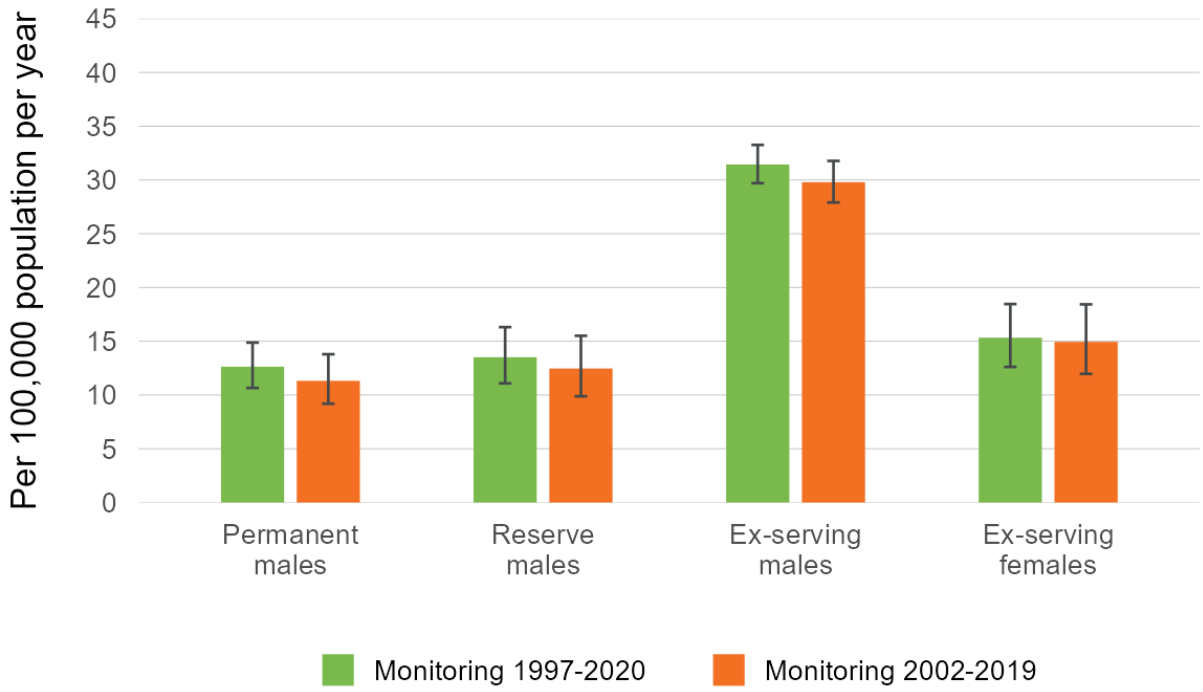
For more information on the demographics of this population, see the report *Serving and ex-serving Australian Defence Force members who have served since 1985: population characteristics 2019.*

How does the expanded monitoring period affect the results?

The expanded monitoring period for reporting and analysis with the addition of those who died by suicide between 1997 to 2001 and in 2020 has resulted in an increase in the number of deaths by suicide reported relative to the previous report. This publication reported a total of 1,273 suicide deaths occurring between 2001 and 2019, whereas 1,600 suicides deaths are reported here (between 1997 and 2020). However, it is important to understand that **this increased suicide count does not reflect a higher risk of suicide to the ADF population.** Rather, the number of deaths by suicide identified has increased because we are reporting on deaths within an expanded monitoring period.

Care should be taken in comparing data in this report with previous AIHW publications. When comparing the results published here to those released in earlier updates, it is more useful to focus on suicide rates, as these give a better indication of the risk of suicide to different groups within the ADF population. As shown in Figure 24, the suicide rates have not significantly changed due to the expanded monitoring period, compared to those reported in the previous report.

Figure 24: Suicide rates by service status group and sex, of ADF members who have served at least one day since 1 January 1985 and have died by suicide from 1997–2020 and 2002–2019.



Source: AIHW analysis of linked Defence Historical Personnel data–PMKeyS–NDI data 1985–2020; NMD 1997–2020; Defence population snapshots, 2002–2020.

ADF suicide deaths in the period 1 January 1985 to 31 December 1996

This publication reports 1,600 confirmed suicide deaths that occurred between 1 January 1997 to 31 December 2020 among ADF members who have served at least one day since 1 January 1985.

It should be noted that an additional 330 confirmed suicide deaths were discovered by analysis of the period 1 January 1985 and 31 December 1996, meaning a total of 1,930 confirmed suicide deaths that occurred between 1 January 1985 to 31 December 2020 among ADF members who have served at least one day since 1 January 1985.

Confirmed suicide deaths prior to 1997 were not included in this analysis as these are under reported compared to the suicides identified post-1997, due to the quality and completeness National Death Index (NDI) dataset, as there are gaps in identifying data in the NDI which limits the ability to link to Defence personnel data. Therefore, while we are confident that all the confirmed suicides included are true ADF member confirmed suicides, there may be more unlinked and unknown. As such any population study analysis of suicide deaths during this period would be misleading.

For completeness, the number of discovered suicides per year 1985-1997 is given below in Table 13.

Table 13: Number of known deaths by suicide by year, ADF service status groups, 1985–1996

Year	Permanent and reserve	Ex-serving	Total in all ADF service groups[(a)]
1985	*n.p.*	*n.p.*	13
1986	*n.p.*	*n.p.*	7
1987	*n.p.*	*n.p.*	11
1988	*n.p.*	*n.p.*	11
1989	9	15	24
1990	7	16	23
1991	11	17	28
1992	11	22	33
1993	14	31	45
1994	8	35	43
1995	9	39	48
1996	13	31	44
Total[(b)]	112	218	330

n.p. Not available for publication but included in totals where applicable, unless otherwise indicated. In this case this is a result of low numbers being potentially identifying.

Notes:

a. Consists of deaths by suicide in males and females for permanent, reserve and ex-serving ADF members.

b. Suicide numbers are likely to be under-reported for this period 1985 to 1996 as there are gaps in identifying data in the National Deaths Index (NDI) which limits the ability to link to Defence personnel data. Therefore, while we are confident that all the confirmed suicides included are true ADF member confirmed suicides, there may be more unlinked and unknown.

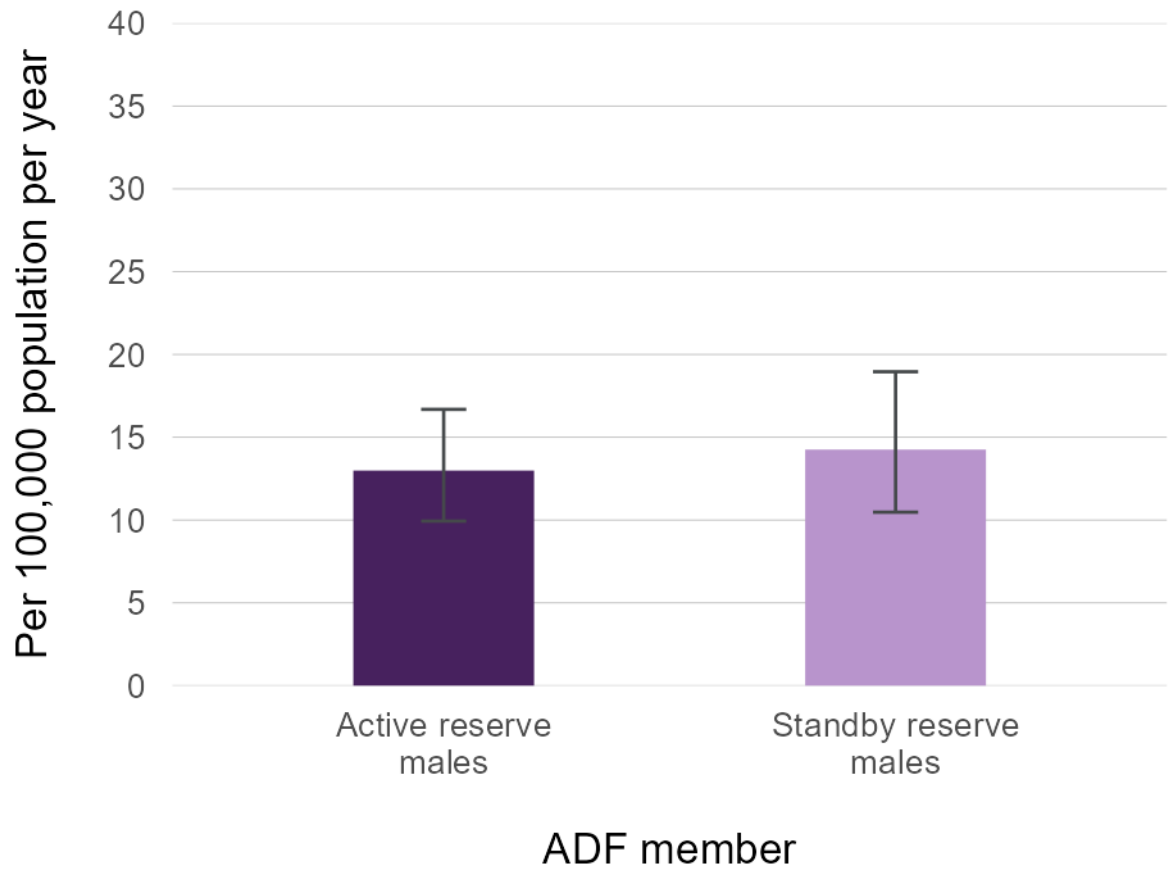
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Active and standby reserves

The active and standby reserve cohorts were aggregated in this report. Despite having difference levels of commitment to the ADF (see Box 1) the suicide rates for these subgroups are statistically similar.

Figure 25 below demonstrates this for males. The values for females are not reported due to low numbers of suicides.

Figure 25: Suicide rates for active and standby reserve males who have served at least one day since 1 January 1985 and have died by suicide between 1997 and 2020.



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.

Limitations in the study population

The study population does not include ADF members with service prior to 1 January 1985. The analysis is constrained by technical limitations in Department of Defence systems and information infrastructure for records before 1985.

Changes to previously published suicide information

An additional 327 suicide deaths are reported here compared to the 2021 report. The breakdown of changes in the number of suicide deaths reported is as follows:

- 241 suicide deaths between 1997 and 2000 in members who separated between 1 January 1985 and 31 December 2001 (and were therefore previously out of scope)
- 79 suicide deaths that occurred in 2020
- 7 additional suicide deaths identified in 2019 due to a lag in reporting cause of death
- 7 additional suicide deaths identified in 2010 (2), 2014 (2), and 2018 (3) due to newly identified linkages
- 6 fewer deaths in 2008 (1), 2011 (1), 2012 (1), 2014 (2) and 2015 (1) due to the omission of Defence Suicide Database (DSD) identified deaths (see Data Sources for further information)
- 2 fewer deaths in 2007 (1) and 2015 (1) due to updates in cause of death information in the National Death Index (NDI)
- 1 additional suicide that occurred between 2001 and 2007 that was previously not reported where precise date of death year was not recorded in the NDI

As well as the expansion of the suicide monitoring period and addition of a new year of cause of death data, there are three main reasons for changes to previously published suicide results, as described below.

Lag in cause of death information

Analysis in this study is based on year of occurrence of death. The NDI is the source of information on fact of death in this study. Fact of death information from the NDI is supplemented with cause of death information from the National Mortality Database (NMD). Results published in the report *Serving and ex-serving Australian Defence Force members who have served since 1985: suicide monitoring 2001 to 2019* for deaths that occurred in 2019 were based on preliminary cause of death information from the NMD. This was the most recent version of cause of death information at the time of reporting.

Analysis of the NMD for all Australian deaths shows that between 4% and 7% of deaths are not registered until the next year (ABS 2018). These deaths are not captured in cause of death information, until data for the next year become available. This means that while fact of death information was complete for 2019 at the time of publishing the report *Serving and ex-serving Australian Defence Force members who have served since 1985: suicide monitoring 2001 to 2019*, cause of death information was missing for a number of deaths included in the analysis at that time. Additional suicides that occurred in 2019 but that were not registered until 2020 have now been identified with the inclusion of preliminary 2020 cause of death information in the current results.

Cause of death data revisions (ABS)

Cause of death information for the *Serving and ex-serving Australian Defence Force members who have served since 1985: detailed analysis from 1997 to 2020* release is based on final cause of death information for the years 2001 to 2018. Revised data are used for 2019 and preliminary data for 2020. Cause of death for a small number of records linked to the 2019 (revised) and 2020 (preliminary) cause of death data may change where a death is being investigated by a coroner and more up-to-date information becomes available as a result of the ABS revisions process. This may have a small effect on the number of deaths

attributed to suicide in these years, as some deaths currently coded as ‘undetermined intent’ could later be identified as ‘intentional self-harm’ (or vice-versa).

Although this method likely captures the vast majority of suicides, there is potential for some to be missed if coronial findings take longer than four years and the finding results in an update to the initial coded intent of death.

Care needs to be taken when interpreting data derived from deaths registered in Victoria. Following investigations between the ABS and the Victorian Registry of Births, Deaths and Marriages, 2,812 additional registrations from 2017, 2018 and 2019 were identified that had not previously been provided to the ABS. A time series adjustment has been applied to these deaths to enable a more accurate comparison of mortality over time. Affected deaths are presented in the year in which they were registered (i.e. removed from 2020 and added to 2018 or 2019). For detailed information on this issue please refer to Technical note: Victorian additional registrations and time series adjustments in Causes of death, Australia (ABS cat. no. 3303.0) available from the ABS website.

Improvements in information available to the study

Changes to previously published results may also occur as additional information becomes available to the study.

For example, differences in data collection methods and policy around timing of death registration can affect when and how the data is recorded in the ABS collection. Data users should note the potential impact of these changes when making comparisons between reference periods. While such changes will not explain all differences between years, they are a factor that may influence the magnitude of any changes in suicide numbers as revisions are applied (ABS 2018).

Improvements in available information and linkage processes over time have also resulted in additional suicides being identified for periods previously reported on.

Australian Bureau of Statistics (ABS) changes to mortality coding over the study period

The following information on mortality coding is sourced from the ABS. For further information, see the ABS *Causes of death, Australia* report (ABS 2018).

Substantial changes to ABS cause of death coding were undertaken in 2006, improving data quality by enabling the revision of cause of death for open coroner’s cases over time. Deaths that are referred to a coroner (including deaths due to suicide) can take time to be fully investigated. To account for this, all coroner-certified deaths registered after 1 January 2006 are subject to a revisions process. This allows cause of death for open coroner’s cases to be included at a later stage where the case is closed during the revision period. Cause of death data are deemed preliminary when first published, with revised and final versions of the data being historically published 12 and 24 months after initial processing. Between 2001 and 2005, revisions did not take place and as such it is recognised by the ABS that deaths by suicide may have been understated during this period (ABS 2018).

As well as the above changes, new coding guidelines were applied to deaths registered from 1 January 2007. The new guidelines improve data quality by enabling deaths to be coded as suicide by ABS mortality coders if evidence from police reports, toxicology reports, autopsy reports and coroners’ findings indicates the death was due to suicide. Previously, coding rules required a coroner to determine a death as due to suicide for it to be coded as suicide.

The combined result of both changes has been the more complete capture of deaths by suicide, and a reduced number of deaths coded as ‘undetermined intent’, within Australian

mortality data. The NCIS also continually makes improvements and enhancements to their system which allows for ABS coding to be accessed in a more timely fashion.

Detailed information on coding guidelines for intentional self-harm, and administrative and system changes that can have an impact on the mortality data set, can be found in Explanatory Notes 91-100 of Causes of death, Australia report (ABS 2018).

Rates based on small numbers

Rates based on small numbers of events can fluctuate from year to year for reasons other than a true change in the underlying risk of the event.

In this report, rates are not reported when there are fewer than 5 events, as rates produced using small numbers can be sensitive to small changes in counts of deaths over time.

Suicide incidence rates

This report uses incidence rates to measure how often suicide occurs amongst the three ADF service groups, as well as in the Australian population. The incidence rate is the total number of deaths by suicide in a population over a specific period of time, divided by population time at risk during this time. In this study, the sum of the population at 30 June in each year of the relevant period is used as a proxy for population time at risk. Suicide incidence rates are expressed as the number of deaths per 100,000 population per year.

Rehires

In previous years, a complex procedure was used to identify rehires between Defence personnel (PMKeyS) data extracts, and include these individuals in the ex-serving population in the time between re-hires. This was not possible this year, so it may be that the total ex-serving population is slightly underestimated.

Potential disparity due to dates mismatch between study cohort and suicide monitoring

The study population used in this report comprises of all members with ADF service since 1 January 1985, whereas suicide rates are calculated from 1997 to 2020. This gap between the beginning of the study period (1985) and the monitoring period (1997), meaning there are suicides from the period 1985 to 1996 that are not captured in this analysis.

This approach risks introducing uncertainty, since the suicide rates before 1997 are unknown, and unable to be determined due to the data limitations. While regrettable, ultimately the study gains a lot by including this cohort.

This is not an issue for the Cox Proportional Hazards section, where the study population only includes those who separated during or after 1997 (or 2003).

Standardised mortality ratios

Age-adjusted comparisons between the suicide rate in each of the three ADF service status groups and the Australian population were calculated using Standardised Mortality Ratios (SMRs). The SMR is a widely recognised measure used to account for differences in age structures when comparing death rates between populations. This method of standardisation can be used when analysing relatively rare events, that is, where number of deaths is less than 25 for the analysed time period. The SMR is used to control for the fact that the three

ADF service status groups have a younger age profile than the Australian population, and rates of suicide vary by age in both the study populations and the Australian population. The SMRs control for these differences, enabling comparisons of suicide counts between the three service status groups and Australia without the confounding effect of differences in age.

The SMR is calculated as the observed number of events (deaths by suicide) in the study population divided by the number of events that would be expected if the study population had the same age and sex specific rates as the comparison population. SMRs greater than 1.0 indicate a greater number of suicides in the ADF population than expected; and SMRs less than 1.0 indicate a lower number of suicides than expected in the ADF population.

Unlike suicide rates, SMRs only provide information about the two populations the statistic is based on. Comparing SMRs cannot be used to draw conclusions about the relative adjusted mortality rates of the study populations. This is because each SMR measure provides a comparison that is specific to the two populations involved.

Comparisons with the Australian population are not calculated for other breakdowns such as by rank and reason for separation as only adjusting for age and sex does not account for all the differences in the populations. In addition, it is considered more useful to compare between the different levels of these groups rather than with the Australian population.

Age-standardised rates

Age-standardised rates are incidence rates that enable comparisons between populations that have different age structures and over time as the age structure of the population of interest may change. This effectively removes the influence of the age structure on the summary rate—it is the overall death rate that would have prevailed in the standard population if it had experienced at each age the death rates of the population under study.

Direct standardisation was used in this report. To calculate age-standardised rates, age-specific rates were multiplied against a standard population. Directly age-standardised rates were adjusted using the current Australian standard population (that is, the non-recast Australian estimated resident population (ERP) as at 30 June 2001).

Rates are expressed as per 100,000 per population years (AIHW 2022).

Cox proportional hazards model

Survival analysis models the time it takes for an ‘event’ to occur after some ‘intervention’, termed ‘survival time’. The Cox proportional hazards regression model (Cox 1972) is the most common tool for studying the dependency of survival time on one or more predictor variables.

In this report the event measured is death by suicide, and the intervention is separation from the ADF. Each individual enters the model on their separation date, and is censored from further contribution at the point of their death (not by suicide) or on data extract date (31 December 2020) if they are alive. Calculations are then made based on the occurrences of suicide among the model population.

The ‘survival’ package in the statistical computing software R was used to fit the Cox models presented in this study (Fox 2018).

The purpose of modelling is to evaluate simultaneously the effect of multiple factors on the risk of death by suicide at a point in time. This risk is referred to as the hazard rate.

The hazard ratios (HRs) that are reported in this study compare hazard rates between groups within a variable relative to a reference group.

- A HR > 1 indicates that a group is associated with a higher occurrence of suicide
- HR < 1 indicates that a group is associated with a lower occurrence of suicide
- HR = 1 suggests no effect.

If the HR 95% CI includes the value 1, then that suggests there is no strong evidence the group has an effect on the occurrence of suicide. HRs within models can be directly compared, giving rates of interactions between variables while holding all other values constant.

A key assumption of the Cox model is that the effect or hazard for each group within a variable remains proportional over time (the proportional hazards assumption). Tests for proportional hazards were performed on the models presented and, for each variable and each model, the proportional hazards assumption was supported.

Confidence Intervals

This report uses confidence intervals of 95% in the calculation of rates, SMRs and HRs. Broadly speaking wider CIs imply less certainty around a calculated value, and narrower CIs imply more certainty. Specifically, a CI at 95% suggests that repeated samples calculating the CI in the same manner would contain the true value 95% of the time.

Using confidence intervals to test for statistical significance

Statistical significance is based on a measure that indicates how likely it is that an observed difference, or a larger one, would occur under the conditions of the null hypothesis.

In this study, 95% confidence intervals (CIs) are provided for each standardised mortality ratio (SMR) and suicide rate to indicate the level of uncertainty around these estimates due to random fluctuations in the number of suicides over time. Estimates produced using low numbers can be sensitive to small changes in numbers of deaths over time and will therefore have wide CIs. CIs at 95% are provided within this report as they may account for the variation in absolute numbers of deaths by suicide over time (related to the small sample size). These assume that the suicide counts used in this analysis can be described by a Poisson distribution.

It is important to note that there are other sources of uncertainty, such as the linkage error, that are not captured by the provided CIs.

Use of CIs is the simplest way to test for significant differences between service groups and Australian comparison groups. For the purpose of this report, differences are deemed to be statistically significant if CIs do not overlap with each other (when comparing suicide rates) or 1.0 (in the case of an SMR). The CIs in this report cannot be used to determine the significance of differences between rates calculated for overlapping 3-year time periods.

Where the CIs are wide, for example in the case of the SMR for ex-serving females, sensitivity analysis was conducted. This analysis found that slight changes to the numbers of suicides did not significantly alter the result.

About the psychosocial risk factors coding work

The findings presented in the psychosocial risk factors section are from analysis of data produced as an extension of causes of death coding conducted by the Australian Bureau

of Statistics (ABS) (see ABS 2021a). Mortality data and statistics are produced through collaboration of multiple jurisdictions and organisations. Registries of Births, Deaths and Marriages in each State and Territory register deaths in their respective jurisdictions and supply information about the cause of death (including from medical practitioners and coroners) to the ABS. The ABS uses this information and coronial reports sourced from the National Coronial Information System (NCIS) to review and code causes of death in each case, using the International Statistical Classification of Diseases and Related Health Problems, version 10 (ICD-10) (WHO 2019). For deaths by suicide, the ABS relies on NCIS reports, including police, toxicology, autopsy and coronial findings. The causes of death codes determined by the ABS are used in reporting on Australian mortality statistics (collated in the National Mortality Database).

The ABS code multiple causes of death to codes for individual deaths, identifying one underlying cause of death as well as associated causes of death. While the underlying cause of death is the primary cause, the associated causes of death are 'any intervening causes, and those conditions that contributed to death but were not related to the disease or condition causing death' (ABS 2021a). Since 2017, the ABS has expanded on the associated causes captured to include psychosocial risk factors for deaths referred to a coroner, funded by the National Suicide and Self-harm Monitoring Project (see ABS 2019; AIHW 2021a).

How is psychosocial and other risk factor coding conducted?

This report presents information on risk factors which were coded by analysts at the ABS from coronial case investigation reports contained in the National Coronial Information System (NCIS). Police, toxicology, pathology and coronial finding reports were all analysed in order to assign ICD-10 codes that represent risk factors that may have affected a person's decision to take their own life. In addition, the ABS reviewed the underlying cause of death and injury for each ADF member and updated these if necessary.

The definition of risk factors included mental and behavioural disorders, drug and alcohol use, chronic disease, chronic pain and lifestyle factors. In addition to this the underlying cause of death and injury was reviewed for each case and updated if necessary.

Category	Description	ICD Chapter Reference	Examples
Natural Disease	Natural disease, as defined by the ABS, includes 'all disease and health related conditions with the exclusion of mental and behavioural disorders, injuries, and external causes' (ABS 2019). Excludes some terminal conditions. Note that natural disease codes cover currently active disease and that past issues with health status and care that affected lifestyle are generally captured in psychosocial risk factors.	These correspond with the ICD-10 codes A00-E90 and G00-R99, U071-U072, U08-U09. Excludes G93, J96, I46, I49, R688, R57, R58.	Chronic pain, insomnia, findings of drugs and alcohol in blood.
Mental and Behavioural Disorders	Mental and behavioural disorders, defined as 'a clinically recognizable set of symptoms or behaviours associated in most cases with distress and with interference with personal functions' (WHO 1992).	ICD-10 codes F00-F99.	Depression, post-traumatic stress disorder (PTSD), anxiety disorders.
Psychosocial Risk Factors	ABS define psychosocial risk factors 'social processes and social structures which can have an interaction with individual thought or behaviour and health outcomes' (ABS 2019).	ICD-10 codes Z00-Z99	Family disruption, employment status, legal issues.

Note that for the Australian population, the presence of natural disease risk factors was confirmed by the assessment of ICD codes present in part 2, line 6 of an individual's death certificate. This was to ensure that natural disease ICD-10 codes were indeed associated

causes of death and not modes of death. It is acknowledged that the natural disease associated causes may be recorded elsewhere on a death certificate due to the space limitations if many associated causes were recorded for an individual, and therefore would not be included in this analysis. However, this affects a small number of individual records.

For further information on the methodology developed by the ABS, in consultation with stakeholders, see Psychosocial risk factors as they relate to coroner-referred deaths in Australia | Australian Bureau of Statistics (abs.gov.au) (ABS 2019).

Scope of psychosocial risk factor coding

This report presents information on psychosocial risk factors for ADF members who died by suicide between 1 January 2001 and 31 December 2020, and who had served at least one day since 1 January 1985.

The ABS used information (coronial reports) from the National Coronial Information System (NCIS) for coding associated causes of death and psychosocial risk factors. The NCIS is limited in that it only includes a nationally complete set of records from 1 January 2001 onwards, there is no centralised death information available prior to this. Therefore, the ABS coding is limited to deaths after 1 January 2001.

Mortality identifiers, also known as Mortality IDs, were used to identify ADF members who died by suicide in the NCIS. Records for 1,354 of the 1,359 ADF member deaths by suicide during the period (deaths that occurred between 1 January 2001 and 31 December 2020) were available for coding, as 5 cases did not link to a record in the NCIS. Cases may not have linked to the NCIS for several reasons, including a change in NCIS ID through time. All five cases occurred between 2001 and 2005.

The ABS piloted a project (ABS 2019) analysing information from the National Coronial Information System (NCIS) to capture psychosocial risks for deaths referred to a coroner in 2017 (ABS 2019). The ABS subsequently coded psychosocial risk factors for all Australian suicides 2017–2020 which are available for analysis in the National Mortality Database (NMD) (see also ABS 2021b).

In this report risk factors are presented for Australian male and females who died by suicide where the death was registered in 2018 (sourced from the NMD). The most recent year of data for which the causes of death data are considered ‘final’ and no longer subject to revisions was 2018. Data includes 90 deaths by suicide which were registered in Victoria in 2018 but were not supplied to the ABS until 2019 due to an issue associated with the Victorian Registry's previous processing system. The causes of death information for these cases are considered revised, not final.

Revisions of risk factor coding

As with underlying cause of death information (see above technical note), some coronial cases were open at the time that the ABS initially coded psychosocial risk factors, and further psychosocial risk factors may be identified as the coronial investigation is finalised. In the ADF member cohort there were 51 open cases that could not be coded further at this time.

For Australian deaths by suicide registered since 2017, the ABS revise the coding of causes of death (including psychosocial risk factors) 2 years after a case is opened. The revised coding of causes of death may result in an increase in the proportion of suicides with psychosocial or other risk factors. Data presented for Australian males and females in this report were for deaths registered in 2018 which are considered final and no longer revised.

Limitations in coding of risk factors

The ABS used information sourced from the National Coronial Information System (NCIS) for coding associated causes of death and psychosocial risk factors. The data available in the NCIS for coding reflects the information that was recorded during the coronial investigation of deaths referred to a coroner. The information available for each case of suicide varies depending on the comprehensiveness of the information collected during the investigation. Australian jurisdictions are governed by different Coronial Acts and 'there will be differences in the processes, type and comprehensiveness of data collection' between different States and Territories (NCIS n.d.).

To consider a factor as an associated risk to a suicide the information must first be reported as part of the investigative process into death. Secondly for the ABS to include that information as in the ICD-10 coded datasets that information must be made available on the NCIS (ABS 2019; 2021). The coding of risk factors 'does not necessarily reflect all causes associated with all suicides that have occurred' (ABS 2021b)

The coded data for ADF members produced by the ABS for the current study will differ from that which is nationally available. Coding of associated causes of death (including psychosocial risk factors) for Australian males and females who died by suicide undergoes a final revision 2 years after the death was registered and is not updated further. For ADF members who died by suicide in the study scope, coding in this study was based on the most updated information recorded in the NCIS regardless of whether the death had been registered more than 2 years previously. The data produced from this project should not be directly compared with other outputs that have used only the National Mortality Database (NMD). Additionally, a specific code was used for the ADF member cohort in the current study (see below).

ADF member specific risk factors

For the purposes of this project, the ABS used a specific code to record 'defence force related deployment' as a risk factor in psychosocial coding. The ABS has used the code Z65.9 which is allocated as 'Problem related to unspecified psychosocial circumstances' in the ICD-10. The Defence force related deployment code is not used in the coding of psychosocial risk factors for suicides among the Australian population. The code 'exposure to disaster, war and other hostilities' in the ICD-10 is used to code risk factors for both the ADF member and the Australian cohorts to capture exposure to military operations. Where both codes are captured for the same ADF member, this indicates the defence related deployment in warlike circumstances. In the report, these codes are captured in the group 'other problems related to psychosocial circumstances' (Z655-Z659).

Acronyms

ABS	Australian Bureau of Statistics
ADF	Australian Defence Force
AIHW	Australian Institute of Health and Welfare
CI	Confidence Interval
DSD	Defence Suicide Database
DVA	Department of Veterans' Affairs
HR	Hazard Ratio
ICD	International Statistical Classification of Diseases and Related Health Problems
NCIS	National Coronial Information System
NDI	National Death Index
NMD	National Mortality Database
PMKeyS	Personnel Management Key Solution
SMR	Standardised Mortality Ratio

Data sources

The information in this report is based on fact of death information from the National Death Index and cause of death information from the National Mortality Database as well as information on members of the three ADF service status groups from Department of Defence payroll systems. The psychosocial factor deaths coding was sourced from information in the National Coronial Information System (NCIS). The details of these sources are as follows:

- **National Mortality Database (NMD).** Cause of Death Unit Record File data are provided to the AIHW by the Australian Coordinating Registry as compiled by the ABS on behalf of Registrars of Births, Deaths and Marriages (RBDM). Cause of death and demographic items are coded by the Australian Bureau of Statistics (ABS) from data originating from the Registrars of Births, Deaths and Marriages and the National Coronial Information System (managed by the Victorian Department of Justice and Community Safety). The data are maintained by the AIHW in the NMD. In this study, the NMD is used in the calculation of Australian rates and SMRs, and is the same source of information on cause of death as used in the NDI.

  NMD is used in the analysis of psychosocial risk factors and associated causes of death for Australian males and females.

- **National Death Index (NDI).** The NDI is managed by the AIHW and contains person-level records of all deaths in Australia since 1980 obtained from the Registrars of Births, Deaths and Marriage in each state and territory. Its use is confined to data linkage studies approved by the AIHW Ethics Committee for health and medical research. NDI records are supplemented with cause of death information from the NMD (AIHW 2018).

  In this study, the NDI is linked with Defence payroll data to create the linked Defence payroll–NDI data set used in analysis of suicide in the ADF population.

- **Department of Defence personnel system data.** The Department of Defence compiled a file of current and historical Defence personnel systems covering ADF members who have served since 1 January 1985. This combines PMKeyS, Core HR system, D1, CENRESPAY (for reservists), ADFPAY (for permanent members) and other historical payment systems. The Department of Defence and AIHW assessed the resulting file for completeness and duplicates. Comparisons were made with records from Department of Defence annual reports and other sources to validate the list. Data from the National Archives was also investigated for its suitability in validation, however as the majority of records are electronic files based on photos of paper records, this was not usable.

- **Defence Suicide Database (DSD).** The DSD is maintained by Defence and contains information on suspected and confirmed deaths due to suicide since 1 January 2000 of members serving full time. This database is linked to PMKeyS and NDI and, in the past, records with a status of ‘confirmed’ were used by AIHW to supplement cause of death data from the NDI (for numbers of suicides only). However, consultation with Defence indicated that confirmation of suicides on this database is based on the same coronial information as the NMD and the NDI, and as such the decision was made to not use it in this year’s report.

- **National Coronial Information System (NCIS).** The National Coronial Information System (NCIS) was established in 2000 and contains information on coroner referred deaths registered since 1 July 2000 for all Australian States and Territories except of Queensland which commenced on 1 January 2001 (NCIS n.d.). Administration of the NCIS is provided by the Victorian Department of Justice and Community Safety.

In this study, information from the NCIS was used by the ABS to code associated causes of death, including psychosocial risk factors, for ADF members who died by suicide. The ABS coding resulted in a risk factor coding dataset which was linked with Defence payroll data.

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- Department of Veteran's Affairs
- Australian Bureau of Statistics
- National Coronial Information System
- Department of Justice and Community Safety (Victoria)
- Royal Commission into Defence and Veterans Suicides

Ethical approval for the study was provided by the AIHW Ethics Committee and the Departments of Defence and Veterans' Affairs Human Research Ethics Committee. The NCIS analysis approval was provided by Justice Human Research Ethics Committee, Coroners Court of Victoria, Tasmanian Coroners Court, and Western Australia Coronial Ethics Committee.

The AIHW also thanks and acknowledges contributions of internal staff from the AIHW; Data Integration Service Centre who conducted the data-linkage, Ethics Privacy and Legal Unit who facilitated the ethics approval process and the Specialist Capability Unit who provided statistical guidance in the methods used for analysis.

The AIHW thanks those AIHW Veterans Advisory Group members who provided review: Professor Libby Roughead, Ms Louise Gates, Mr Ken Foster, Ms Sandi Laaksonen-Sherrin, Prof Jenny Firman, and internal reviews from staff from the AIHW Data Custodian Units: Burden of Disease & Mortality Unit and Suicide and Self-harm Monitoring Unit.

Finally, the AIHW also thanks Mindframe for providing review and advice on the appropriate and sensitive way to report on suicide.

Notes

Data quality statement

The data quality statement underpinning the NDI can be found at: National Death Index (NDI), Data Quality Statement

The data quality statements underpinning the AIHW National Mortality Database can be found in the following Australian Bureau of Statistics (ABS) publications:

- ABS quality declaration summary for Deaths, Australia methodology, 2021 | Australian Bureau of Statistics (abs.gov.au)
- ABS quality declaration summary for Causes of Death, Australia methodology, 2020 | Australian Bureau of Statistics (abs.gov.au)

For more information on the AIHW National Mortality Database, see Deaths data at AIHW and the National Mortality Database.

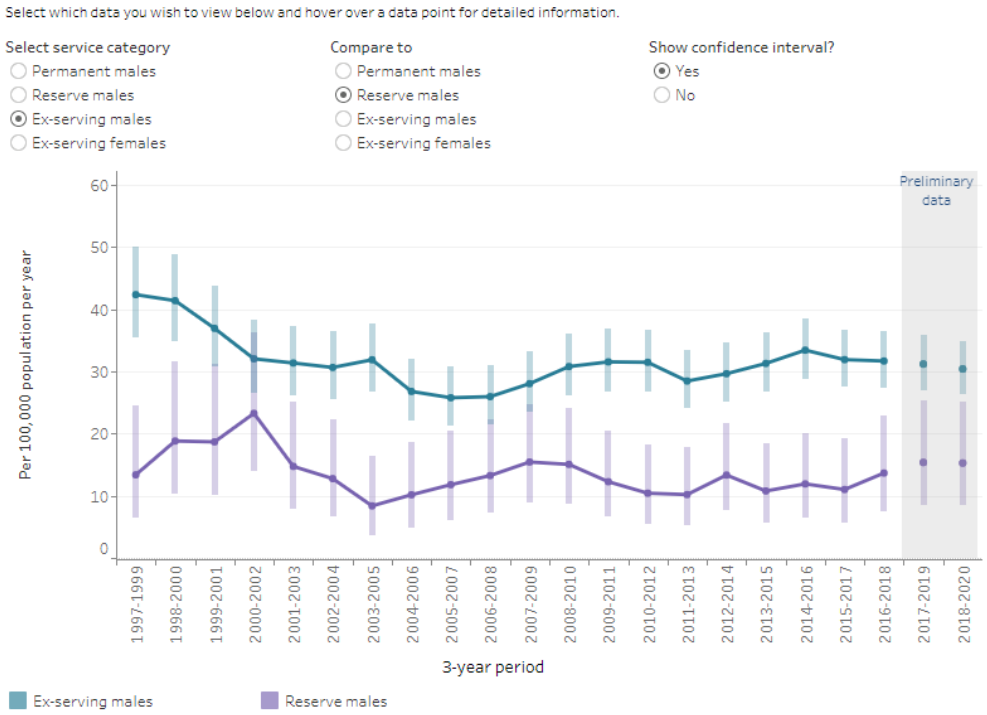
Data

Data tables: Serving and ex-serving Australian Defence Force members who have served since 1985.

Appendix: Images of supplementary suicide rate interactive graphs

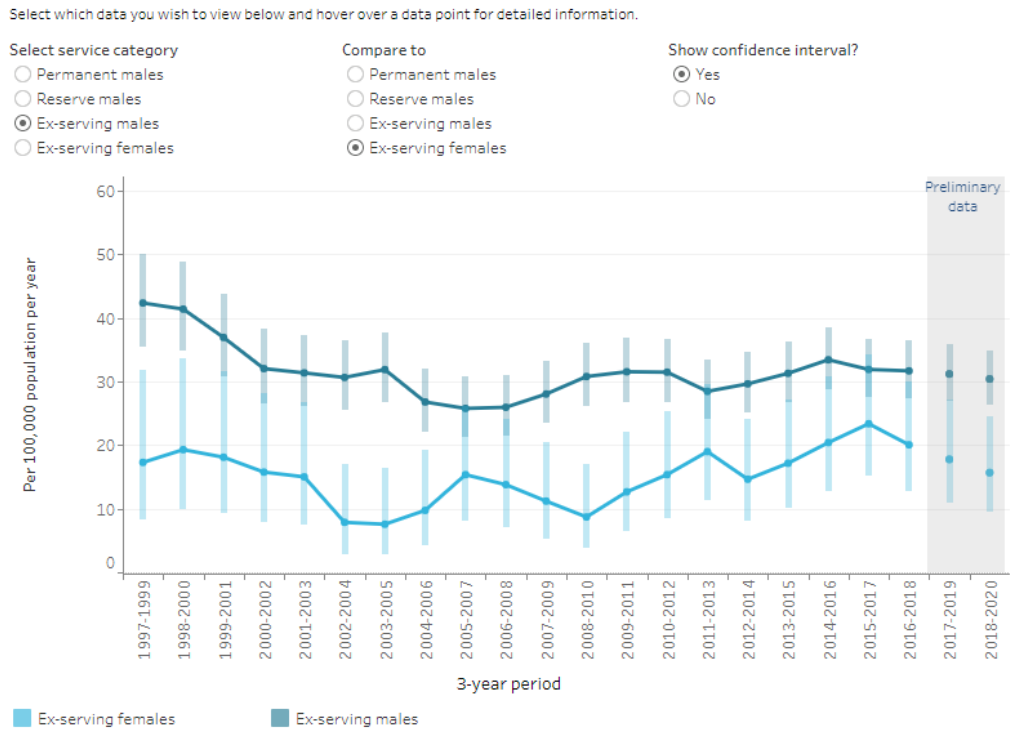
Please note: This appendix contains screenshots of this report's interactive figures, with the interactivity disabled, covering all possible selections. The interactive versions of these figures are available in the web report.

Figure 2(a): Rate of suicide by service status and sex, 1997–1999 to 2018–2020



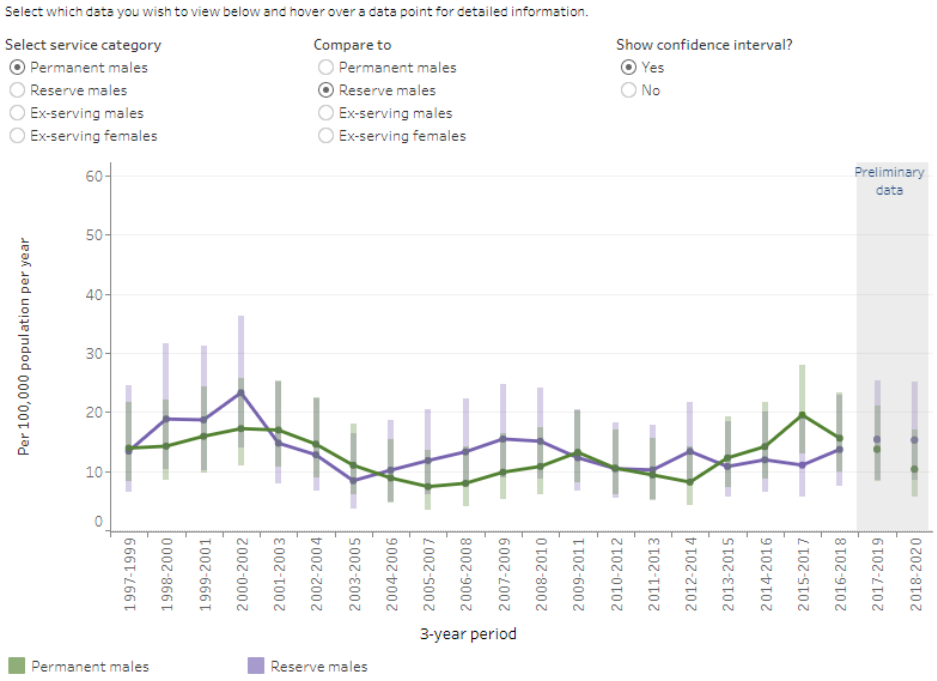
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 2(b): Rate of suicide by service status and sex, 1997–1999 to 2018–2020



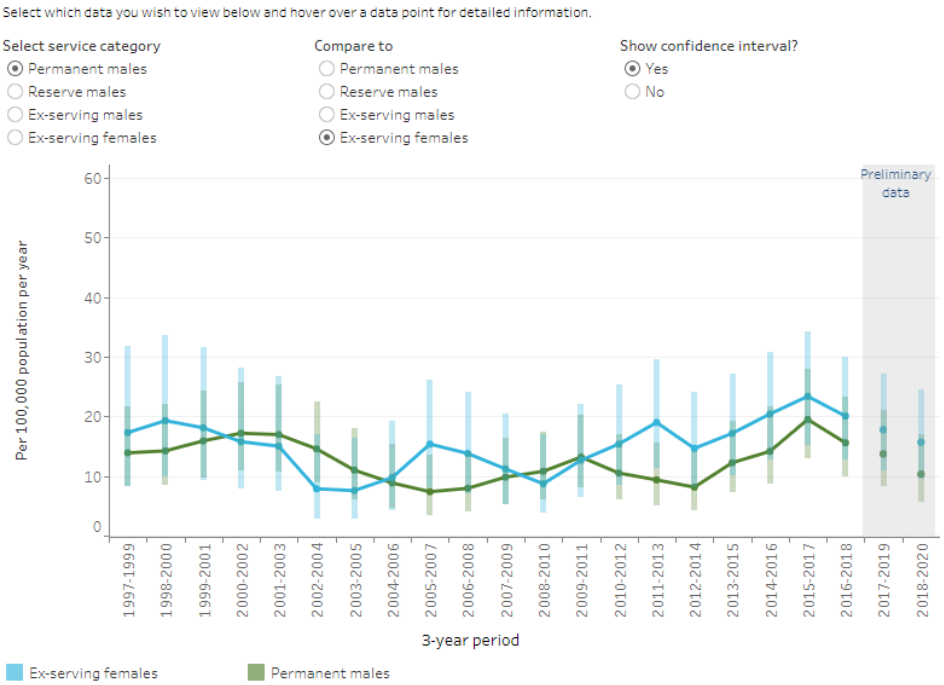
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 2(c): Rate of suicide by service status and sex, 1997–1999 to 2018–2020



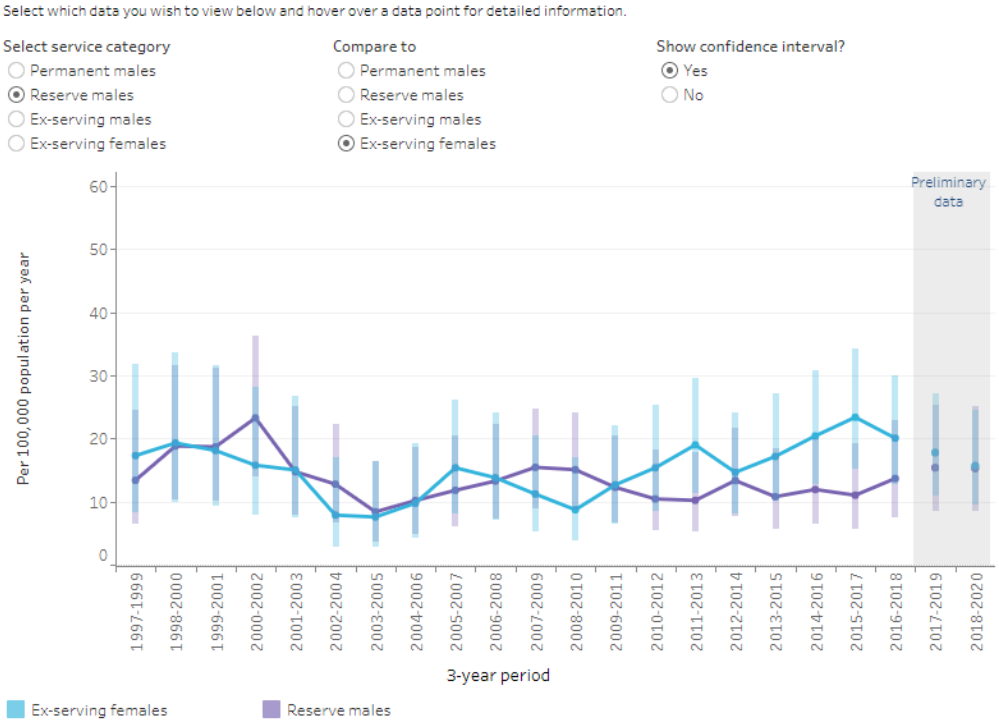
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 2(d): Rate of suicide by service status and sex, 1997–1999 to 2018–2020



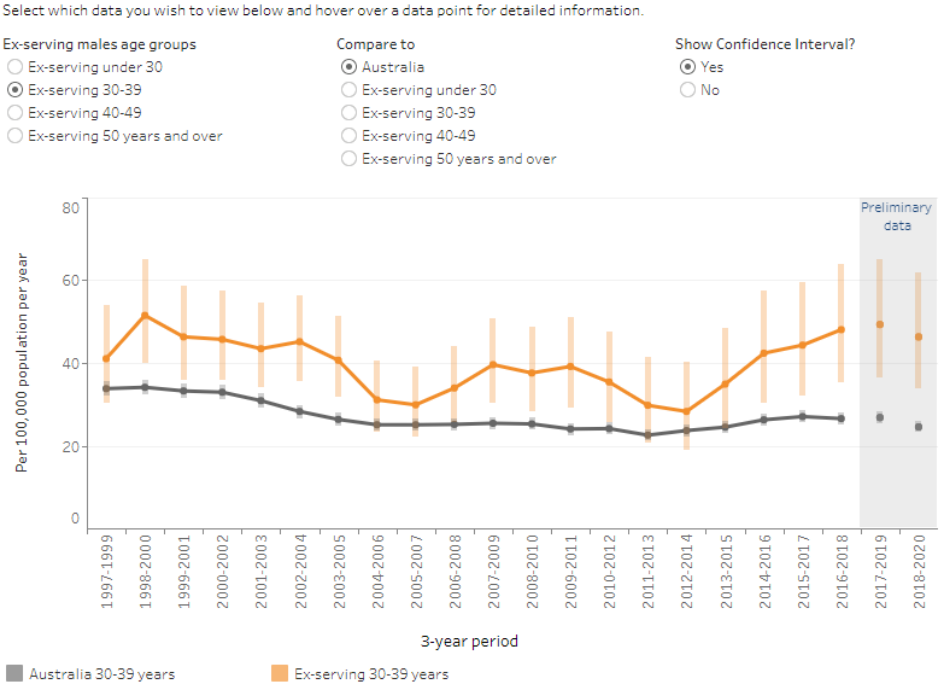
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 2(e): Rate of suicide by service status and sex, 1997–1999 to 2018–2020



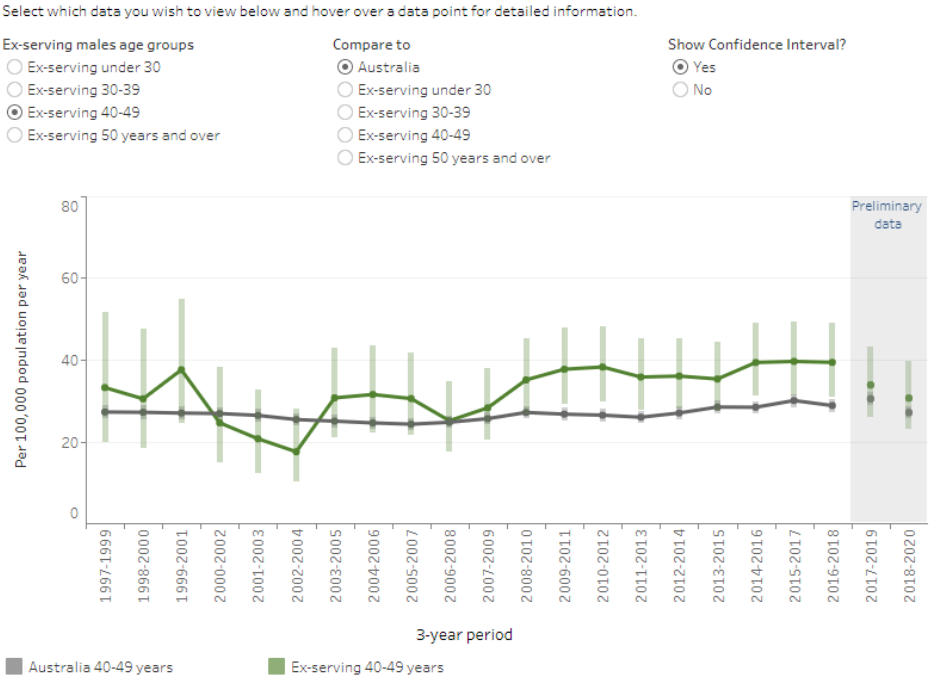
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 6(a): Rate of suicide, ex-serving and Australian males by age, 1997–1999 to 2018–2020



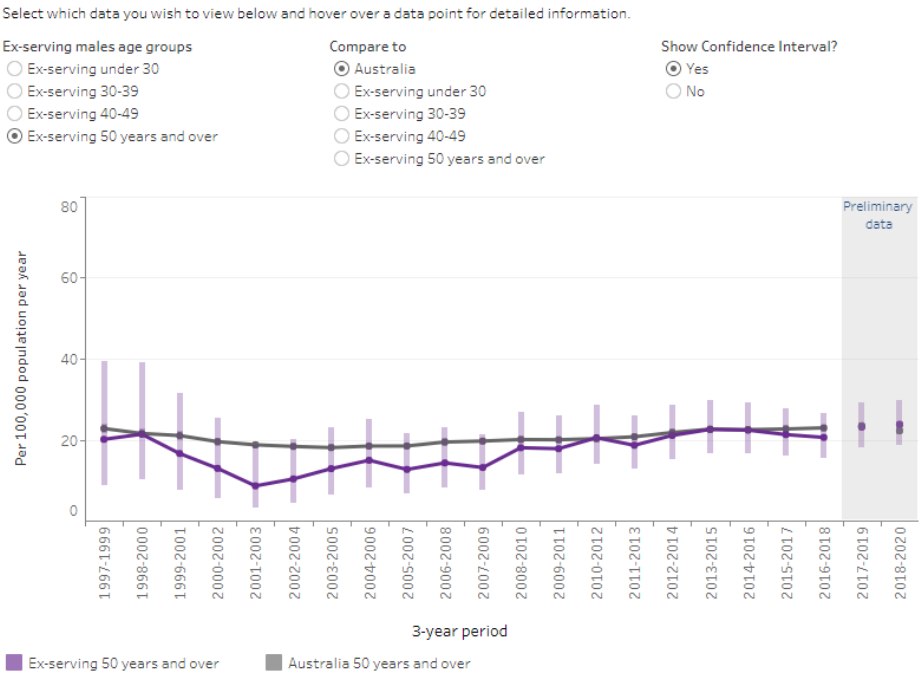
Source: AIHW analysis of linked Defence historical personnel data– PMKeyS–NDI data 1985–2020; ; NMD 1985–2020.
http://www.aihw.gov.au

Figure 6(b): Rate of suicide, ex-serving and Australian males by age, 1997–1999 to 2018–2020



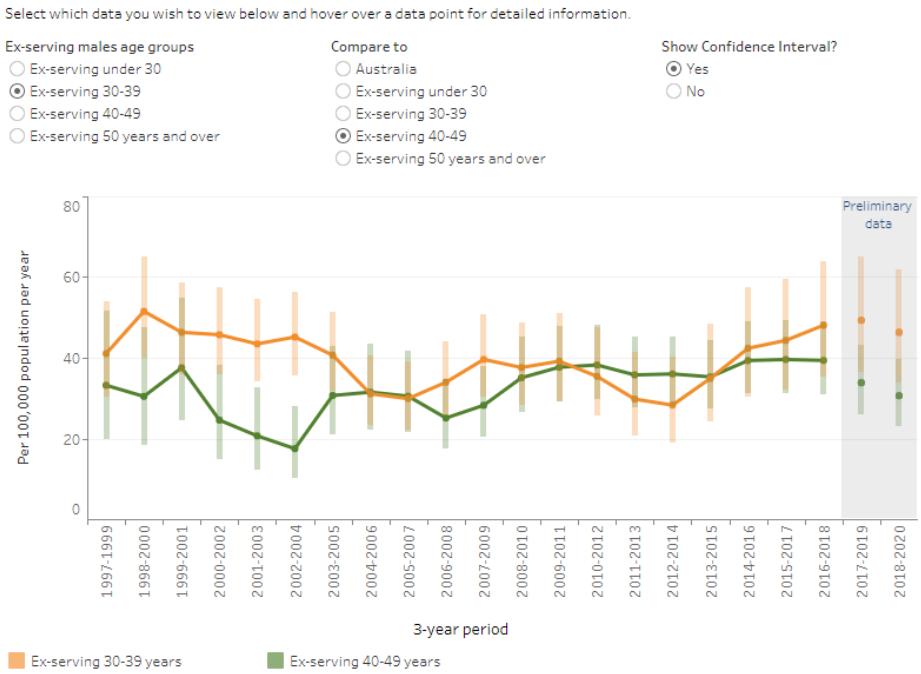
Source: AIHW analysis of linked Defence historical personnel data– PMKeyS–NDI data 1985–2020; ; NMD 1985–2020.
http://www.aihw.gov.au

Figure 6(c): Rate of suicide, ex-serving and Australian males by age, 1997–1999 to 2018–2020



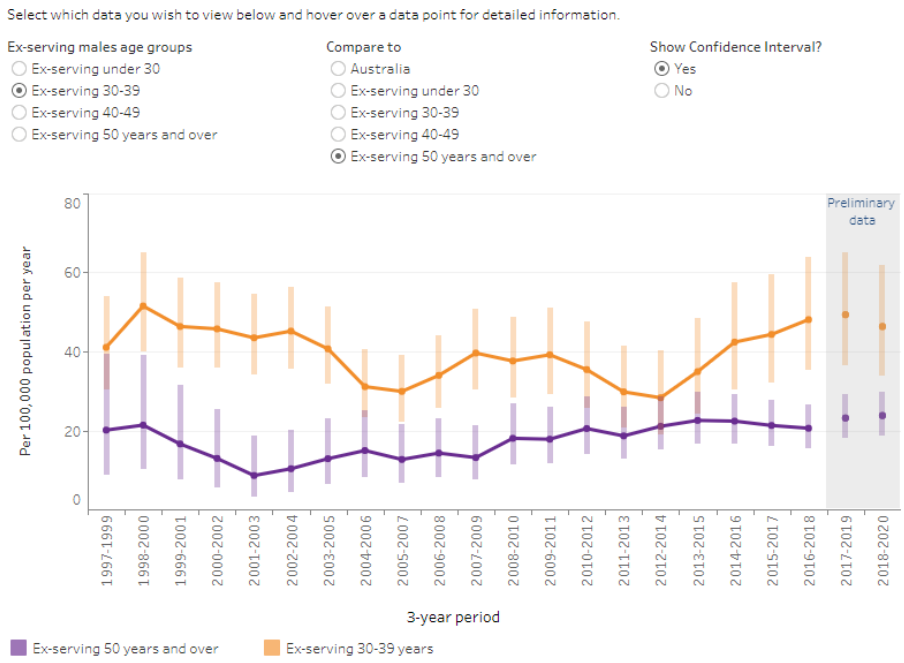
Source: AIHW analysis of linked Defence historical personnel data– PMKeyS–NDI data 1985–2020; ; NMD 1985–2020.
http://www.aihw.gov.au

Figure 6(d): Rate of suicide, ex-serving and Australian males by age, 1997–1999 to 2018–2020



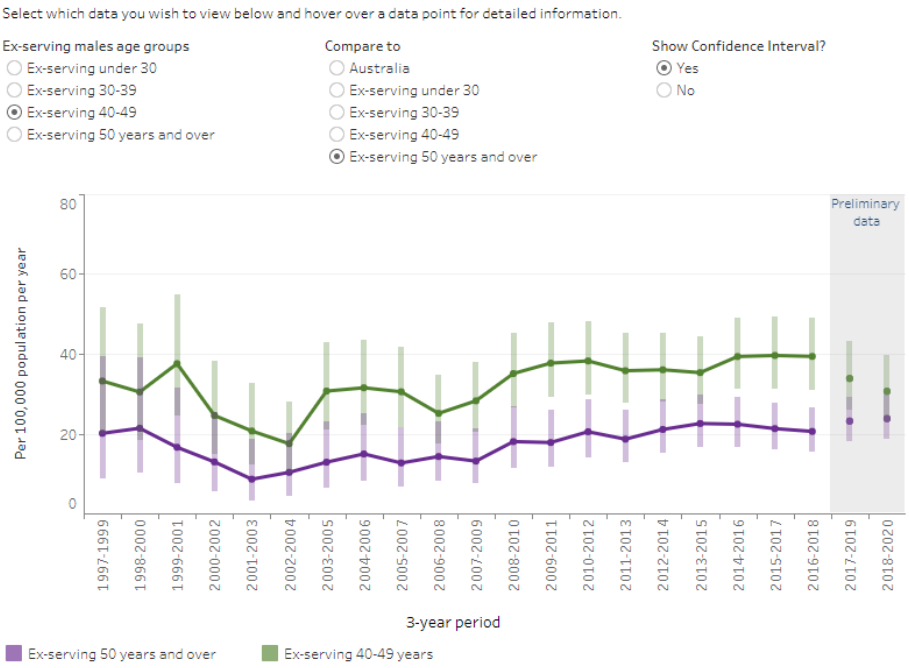
Source: AIHW analysis of linked Defence historical personnel data– PMKeyS–NDI data 1985–2020; ; NMD 1985–2020.
http://www.aihw.gov.au

Figure 6(e): Rate of suicide, ex-serving and Australian males by age, 1997–1999 to 2018–2020



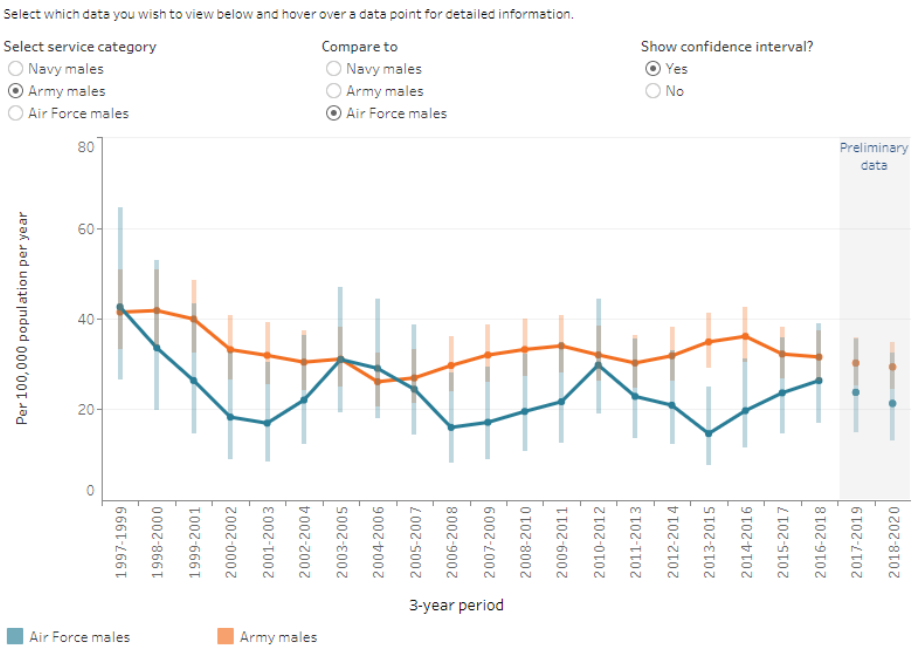
Source: AIHW analysis of linked Defence historical personnel data– PMKeyS–NDI data 1985–2020; ; NMD 1985–2020.
http://www.aihw.gov.au

Figure 6(f): Rate of suicide, ex-serving and Australian males by age, 1997–1999 to 2018–2020



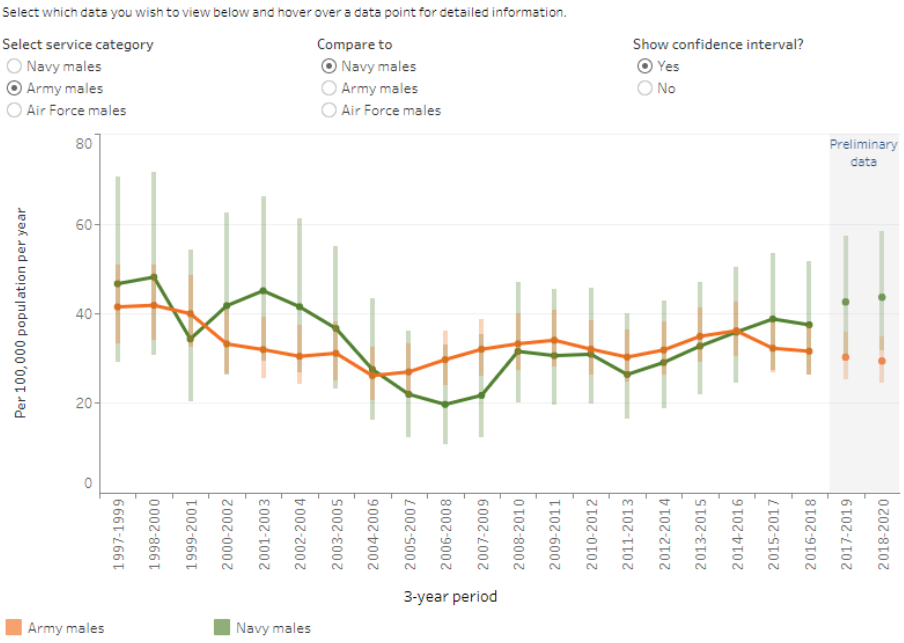
Source: AIHW analysis of linked Defence historical personnel data– PMKeyS–NDI data 1985–2020; ; NMD 1985–2020.
http://www.aihw.gov.au

Figure 9(a): Rate of suicide for ex-serving males by service, 1997–1999 to 2018–2020



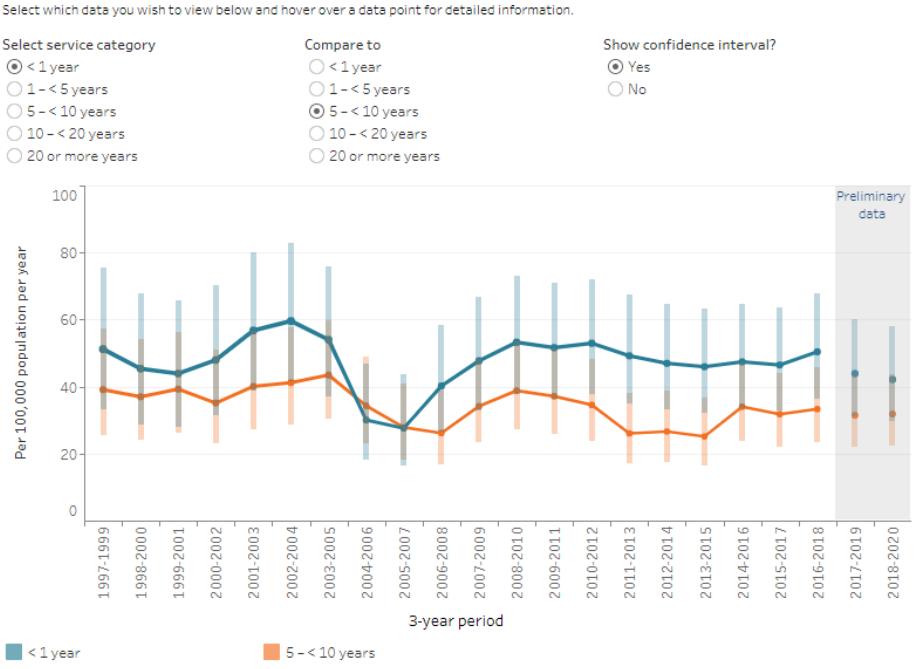
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 9(b): Rate of suicide for ex-serving males by service, 1997–1999 to 2018–2020



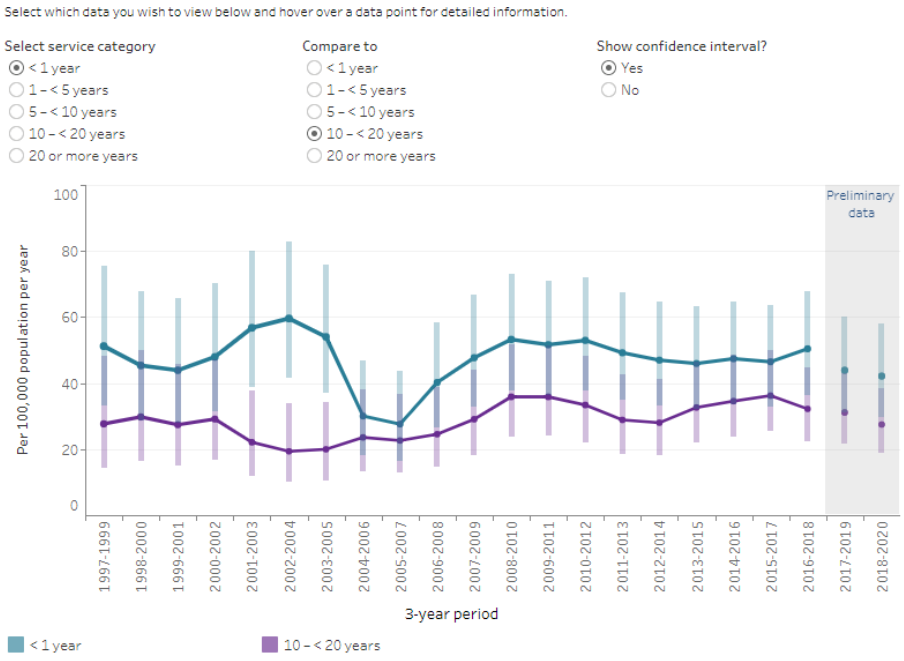
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 13(a): Rate of suicide for ex-serving males by length of service, 1997–1999 to 2018–2020



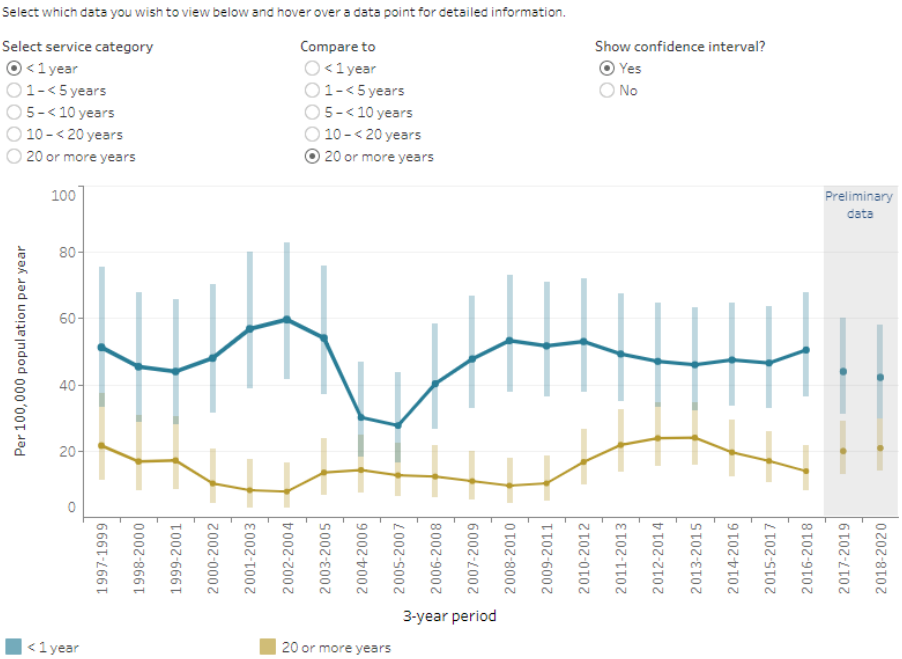
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 13(b): Rate of suicide for ex-serving males by length of service, 1997–1999 to 2018–2020



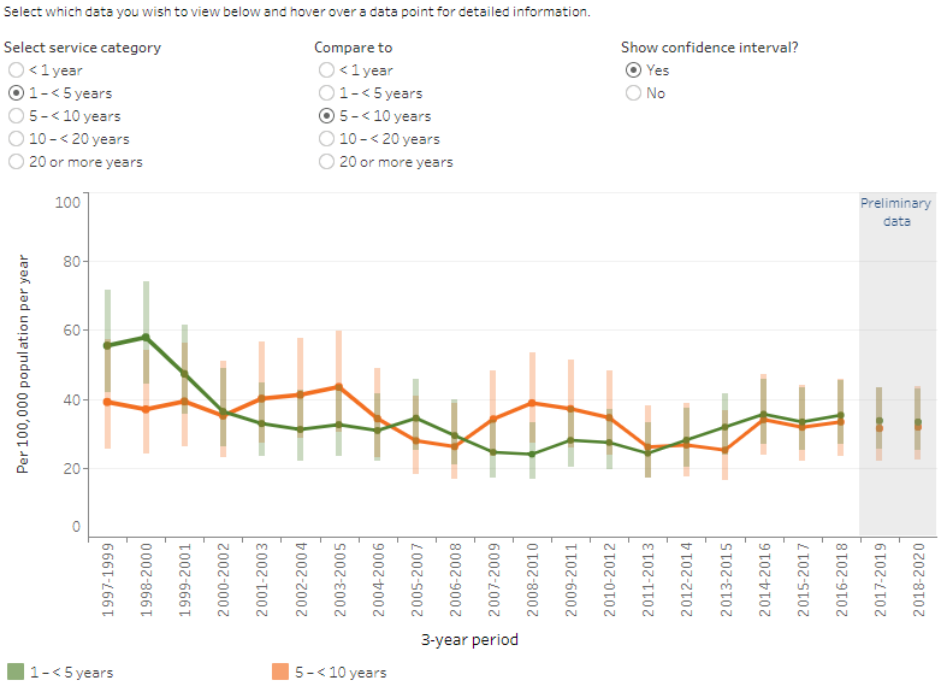
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 13(c): Rate of suicide for ex-serving males by length of service, 1997–1999 to 2018–2020



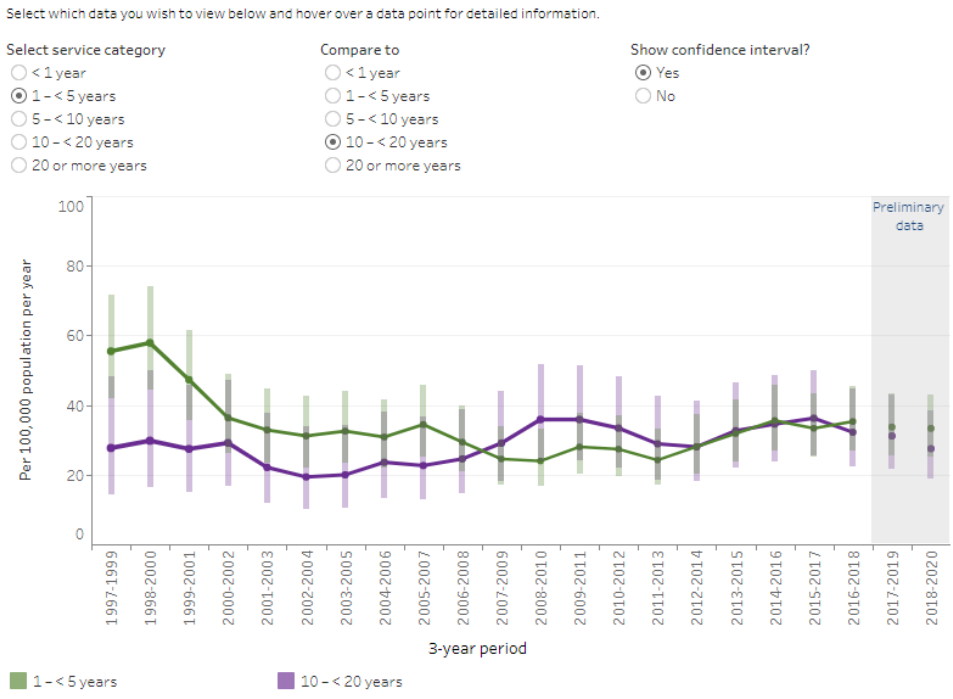
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 13(d): Rate of suicide for ex-serving males by length of service, 1997–1999 to 2018–2020



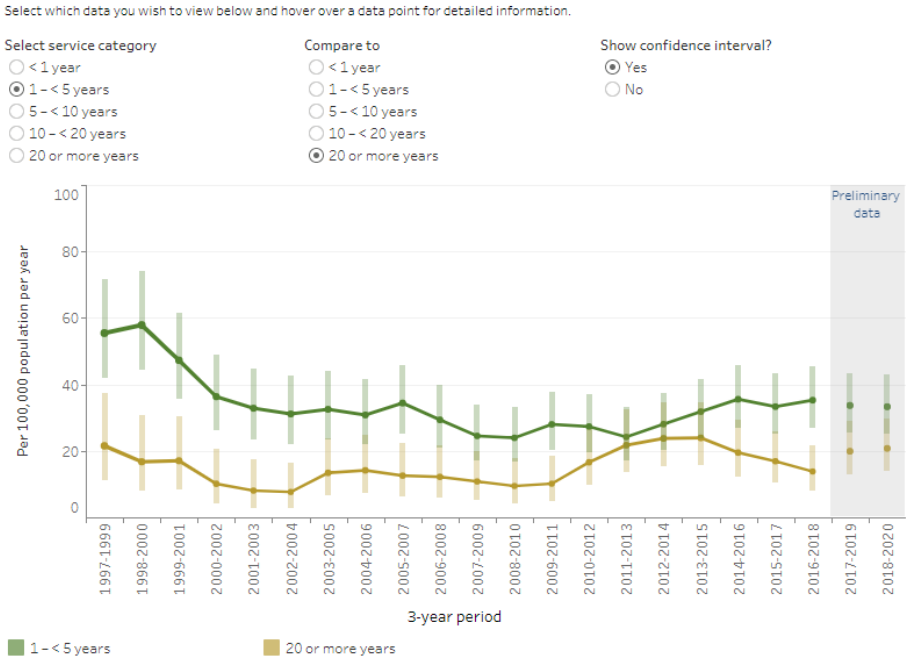
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 13(e): Rate of suicide for ex-serving males by length of service, 1997–1999 to 2018–2020



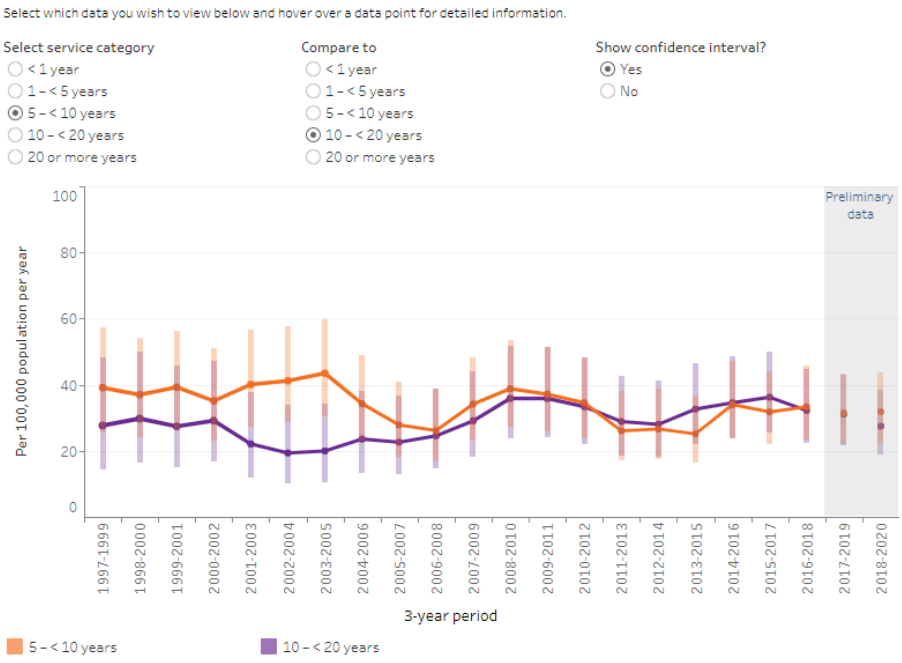
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 13(f): Rate of suicide for ex-serving males by length of service, 1997–1999 to 2018–2020



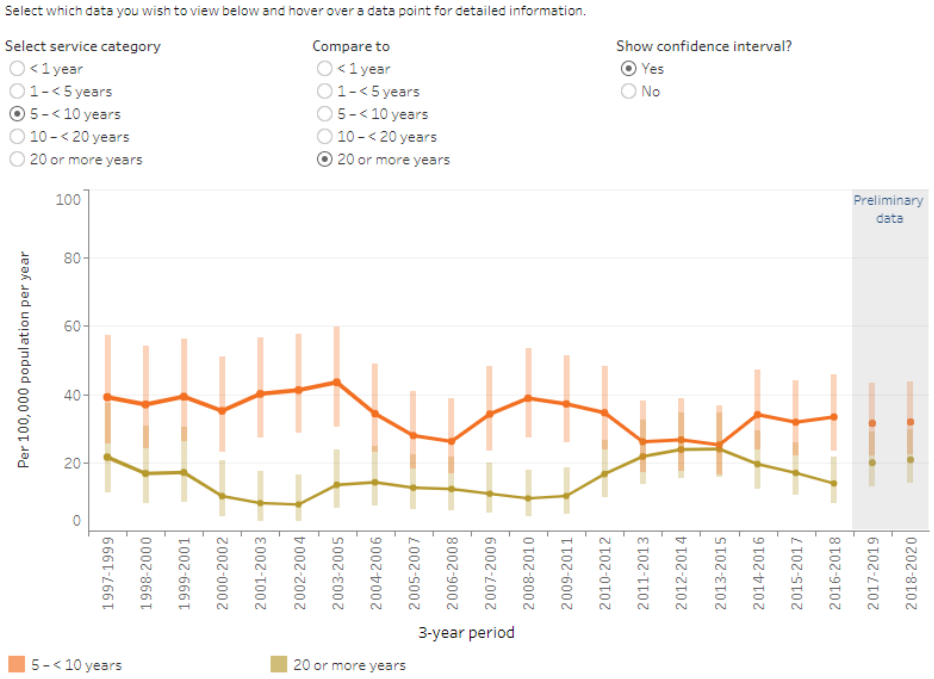
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 13(g): Rate of suicide for ex-serving males by length of service, 1997–1999 to 2018–2020



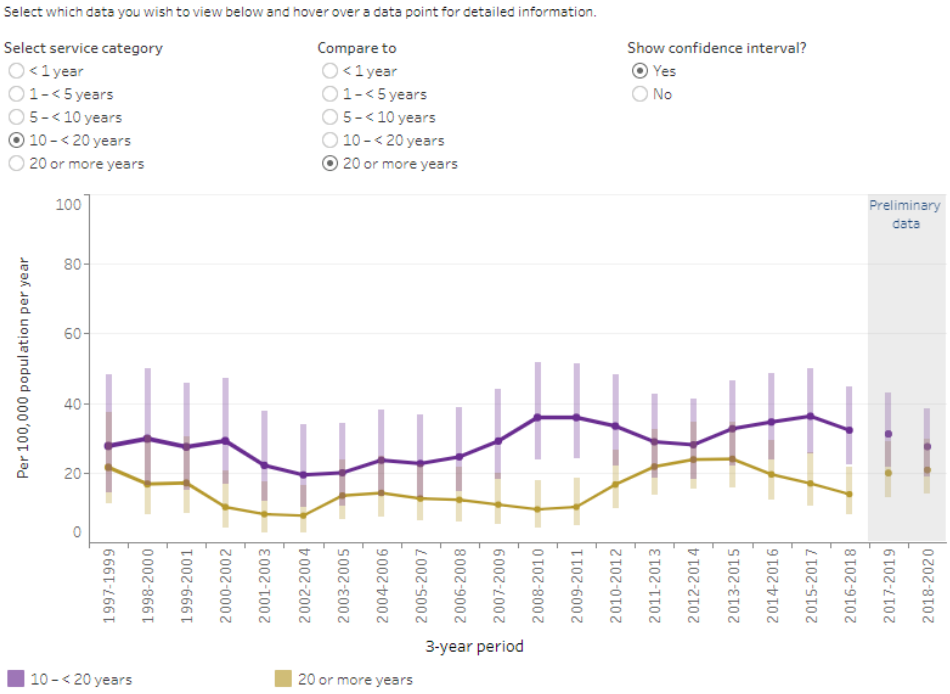
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 13(h): Rate of suicide for ex-serving males by length of service, 1997–1999 to 2018–2020



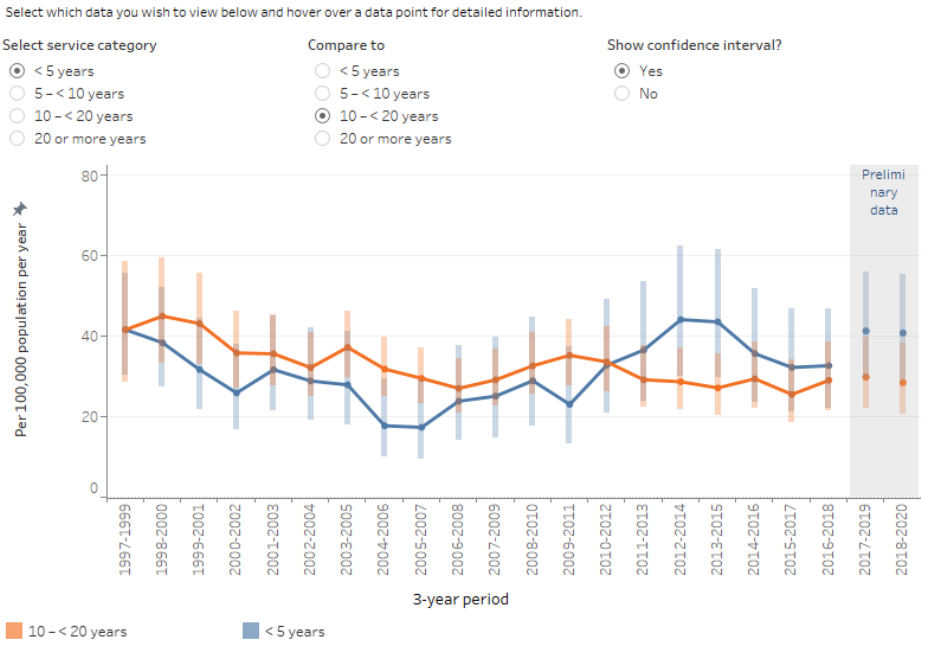
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 13(i): Rate of suicide for ex-serving males by length of service, 1997–1999 to 2018–2020



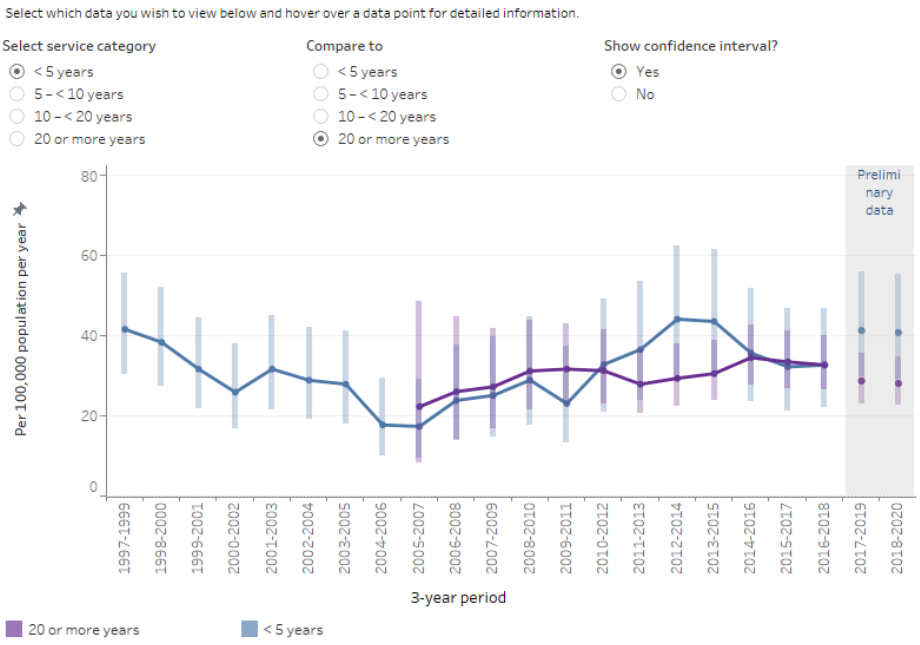
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 15(a): Rate of suicide for ex-serving males by time since separation, 1997–1999 to 2018–2020



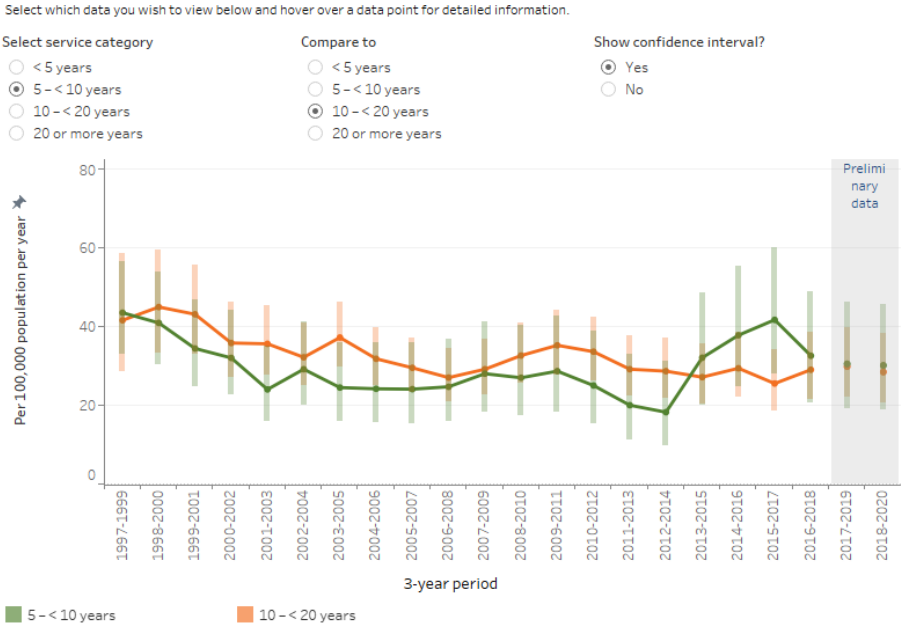
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 15(b): Rate of suicide for ex-serving males by time since separation, 1997–1999 to 2018–2020



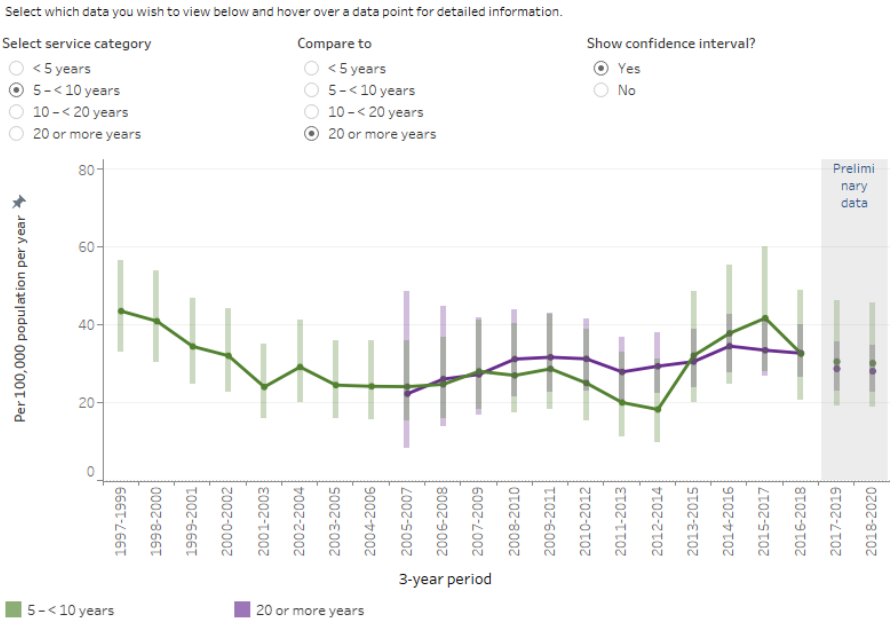
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 15(c): Rate of suicide for ex-serving males by time since separation, 1997–1999 to 2018–2020



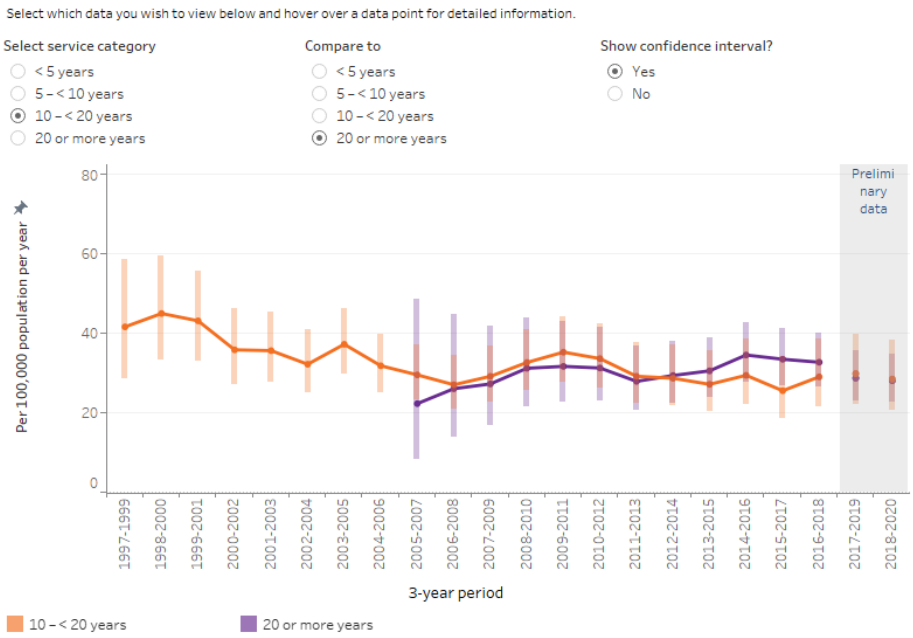
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 15(d): Rate of suicide for ex-serving males by time since separation, 1997–1999 to 2018–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 15(e): Rate of suicide for ex-serving males by time since separation, 1997–1999 to 2018–2020

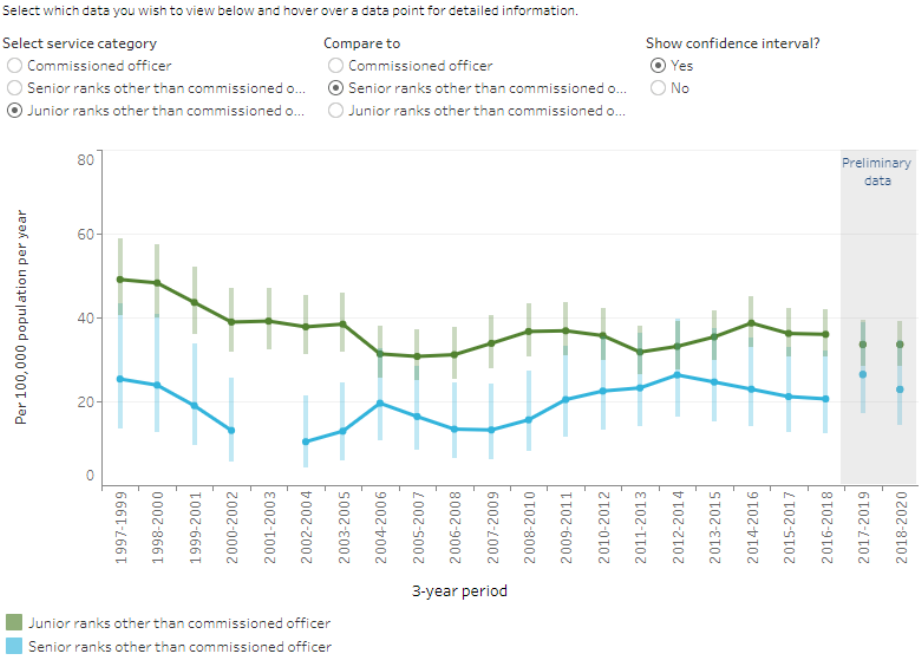


Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 17(a): Rate of suicide for ex-serving males by rank, 1997–1999 to 2018–2020

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 17(b): Rate of suicide for ex-serving males by rank, 1997–1999 to 2018–2020



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2020.
http://www.aihw.gov.au

Figure 20(a): Proportion of ADF males and females who died by suicide, 2001–2020, and Australian males and females who died by suicide, 2018, with at least one risk factor

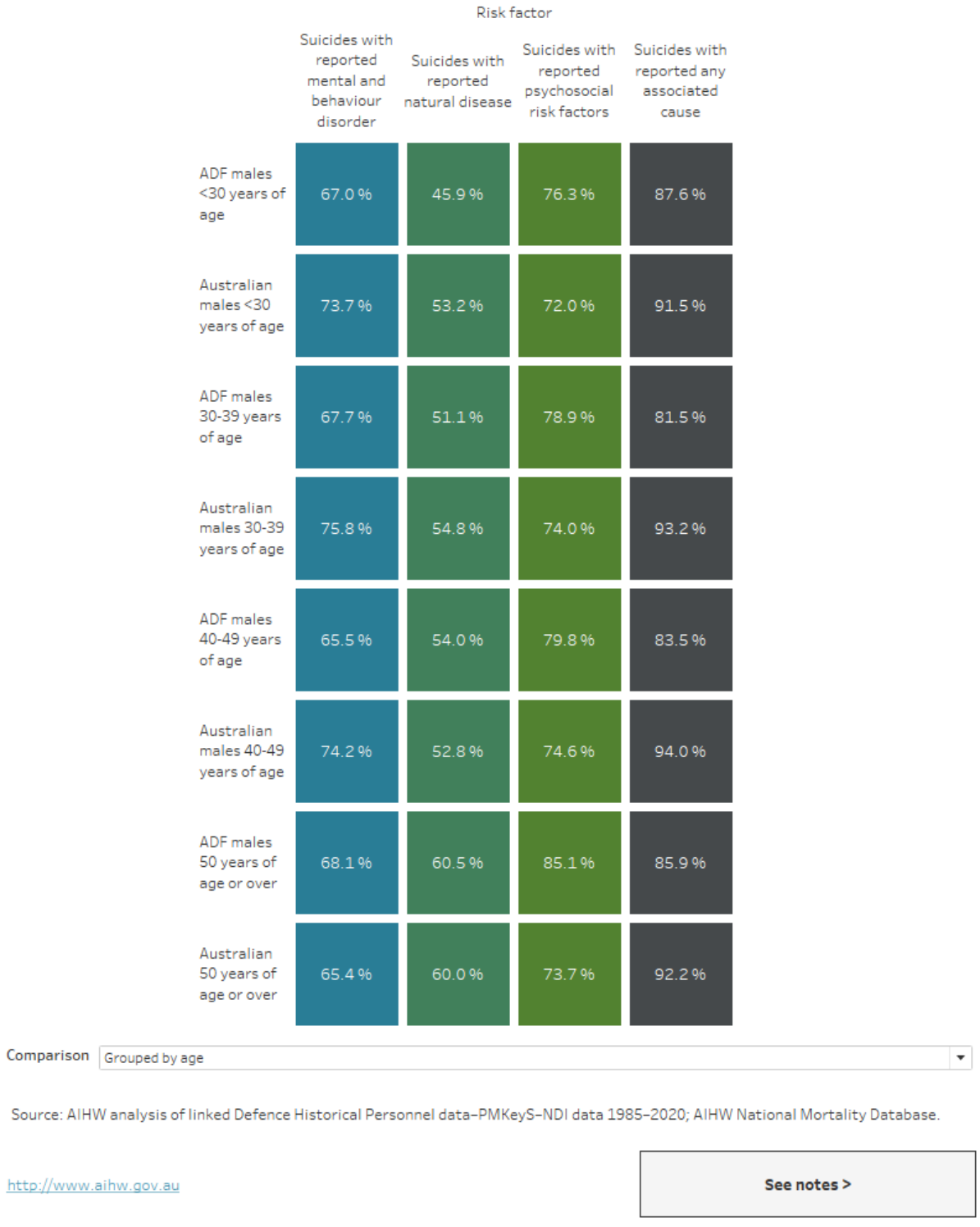
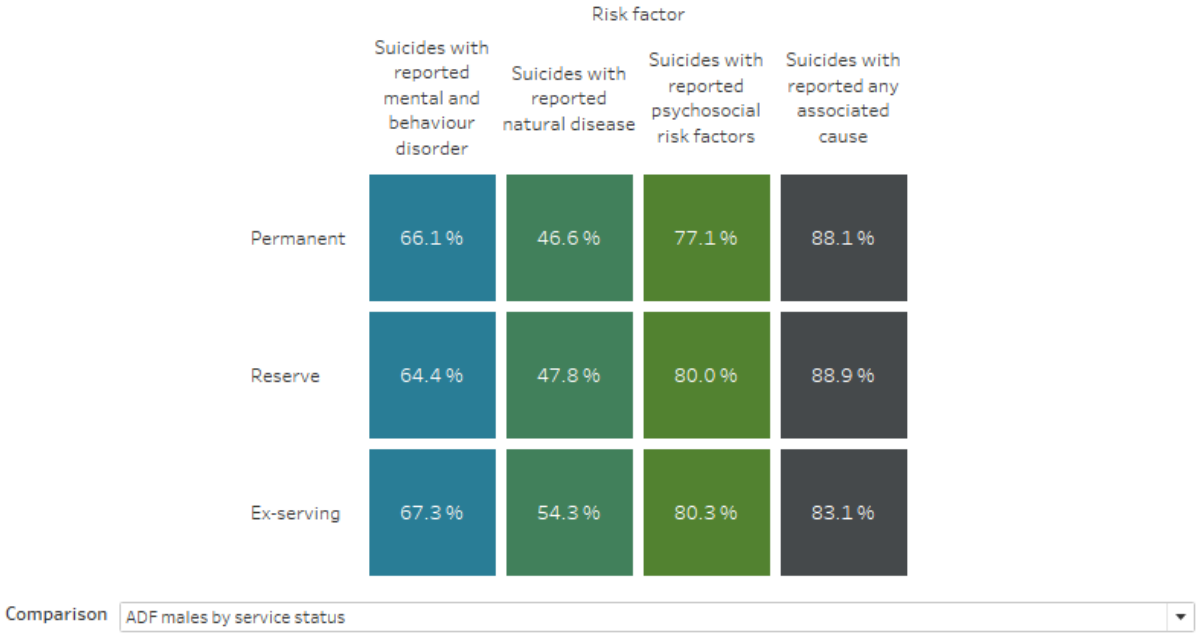


Figure 21(a): Proportion of male ADF members who died by suicide with at least one risk factor, by service-related characteristics, 2001–2020



Source: AIHW analysis of linked Defence Historical Personnel data–PMKeyS–NDI data 1985–2020; AIHW National Mortality Database.

http://www.aihw.gov.au

See notes >

Figure 21(b): Proportion of male ADF members who died by suicide with at least one risk factor, by service-related characteristics, 2001–2020

Source: AIHW analysis of linked Defence Historical Personnel data–PMKeyS–NDI data 1985–2020; AIHW National Mortality Database.

http://www.aihw.gov.au

See notes >

Figure 21(c): Proportion of male ADF members who died by suicide with at least one risk factor, by service-related characteristics, 2001–2020

Figure 21(d): Proportion of male ADF members who died by suicide with at least one risk factor, by service-related characteristics, 2001–2020

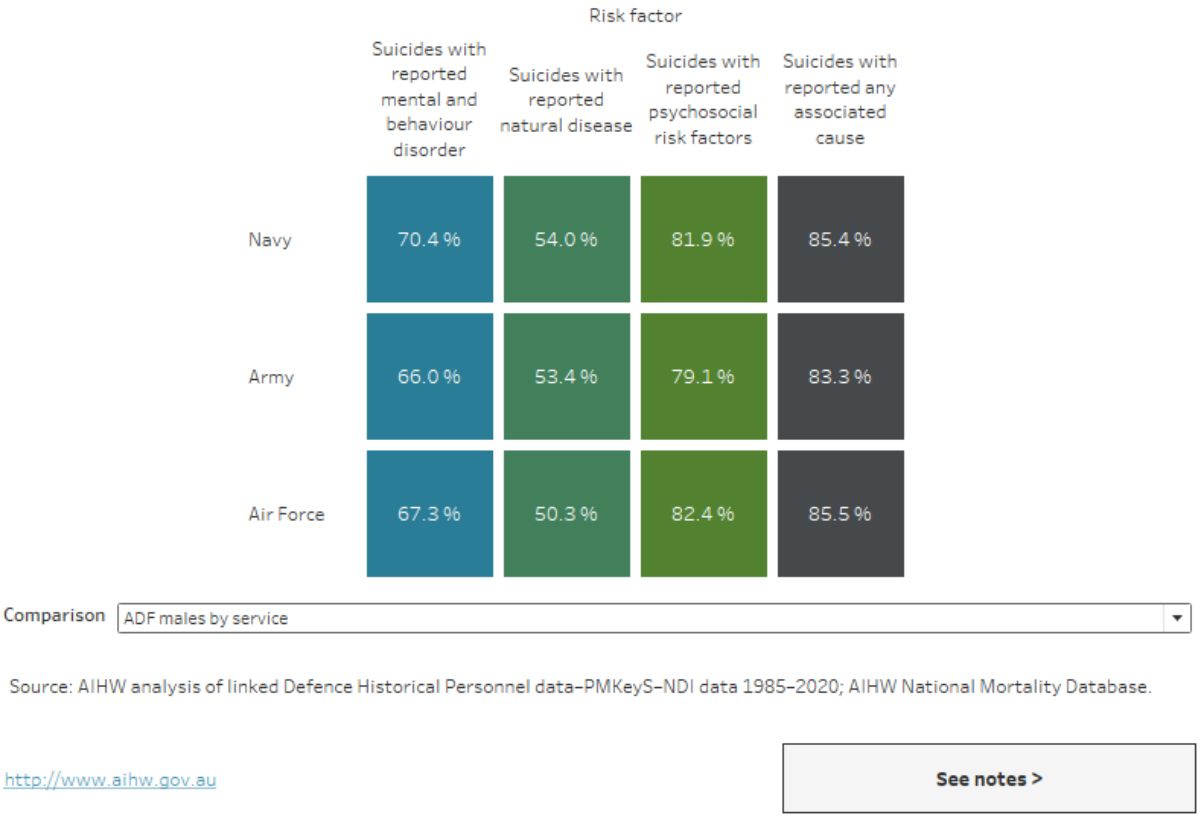


Figure 21(e): Proportion of male ADF members who died by suicide with at least one risk factor, by service-related characteristics, 2001–2020

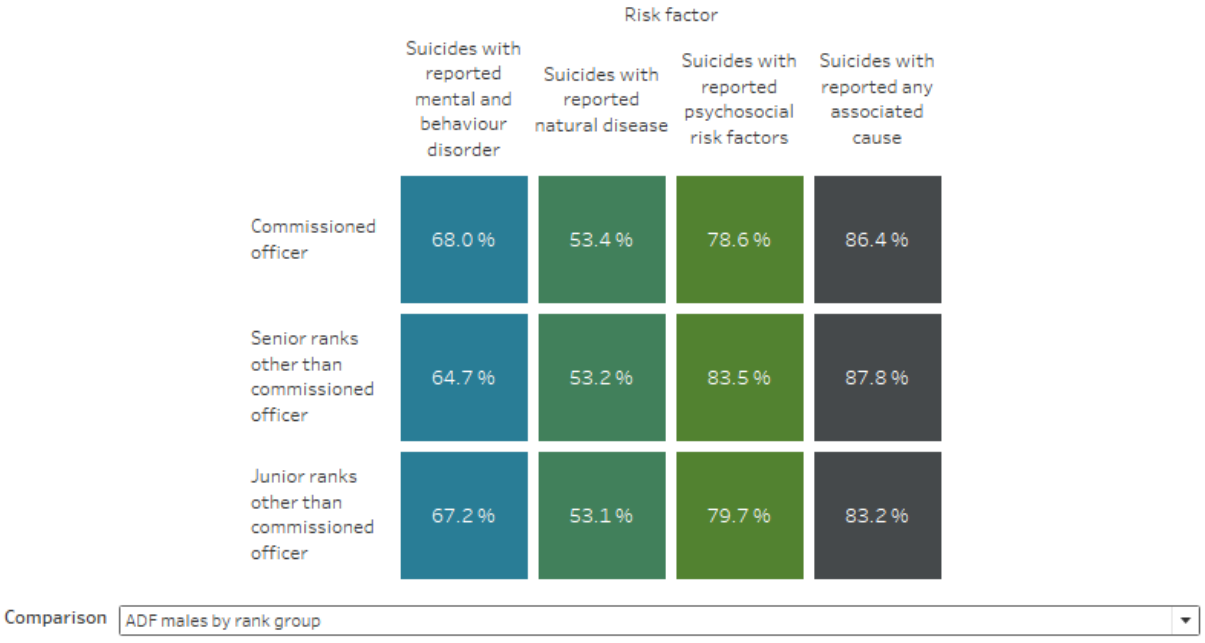
Source: AIHW analysis of linked Defence Historical Personnel data–PMKeyS–NDI data 1985–2020; AIHW National Mortality Database.

http://www.aihw.gov.au

See notes >

Figure 21(f): Proportion of male ADF members who died by suicide with at least one risk factor, by service-related characteristics, 2001–2020

Figure 21(g): Proportion of male ADF members who died by suicide with at least one risk factor, by service-related characteristics, 2001–2020



Source: AIHW analysis of linked Defence Historical Personnel data–PMKeyS–NDI data 1985–2020; AIHW National Mortality Database.

http://www.aihw.gov.au

See notes >

Figure 22(a): Common risk factors identified among ADF males and females who died by suicide, 2001–2020, and Australian males and females who died by suicide, 2018

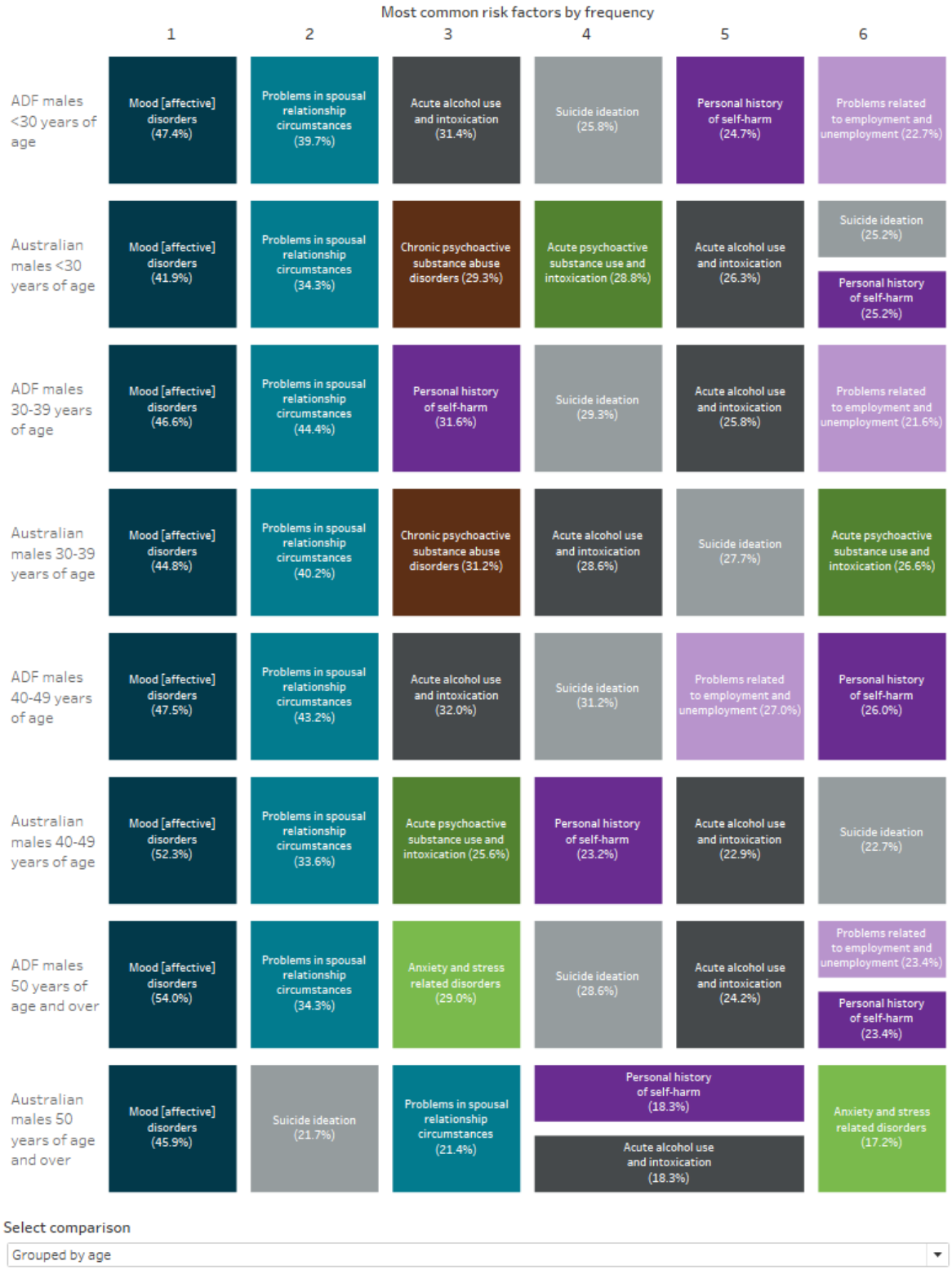
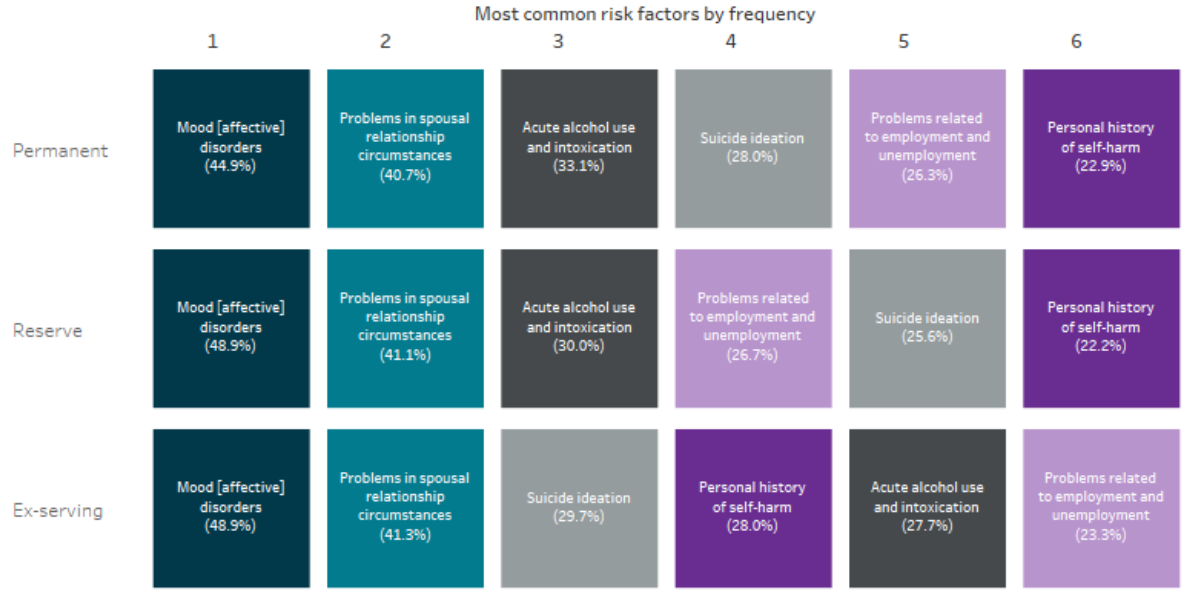


Figure 23(a): Common risk factors identified among ADF males who died by suicide, 2001–2020, by service-related characteristics



Select comparison

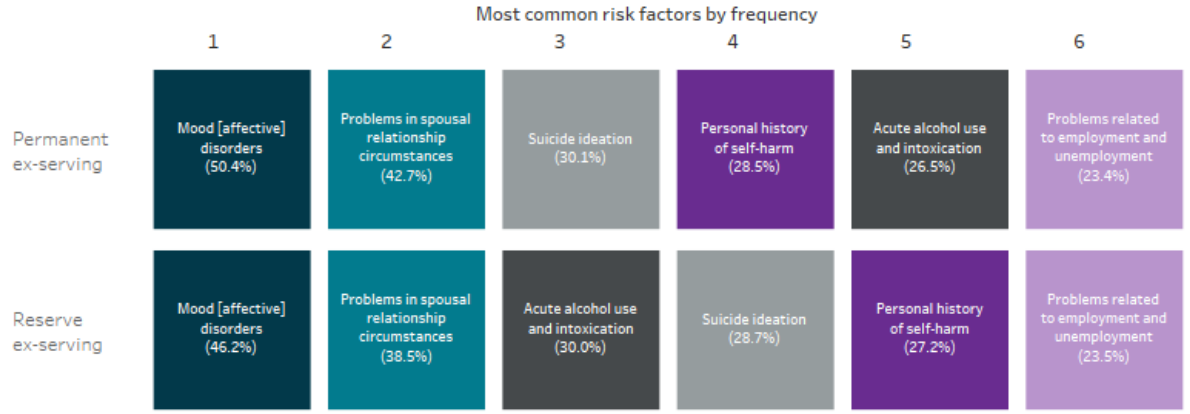
ADF males by service status

Source: AIHW analysis of linked Defence Historical Personnel data–PMKeyS–NDI data 1985–2020; AIHW National Mortality Database.

http://www.aihw.gov.au

See notes >

Figure 23(b): Common risk factors identified among ADF males who died by suicide, 2001–2020, by service-related characteristics



Select comparison

Ex-serving males by prior service status

Source: AIHW analysis of linked Defence Historical Personnel data–PMKeyS–NDI data 1985–2020; AIHW National Mortality Database.

http://www.aihw.gov.au

See notes >

Figure 23(c): Common risk factors identified among ADF males who died by suicide, 2001–2020, by service-related characteristics

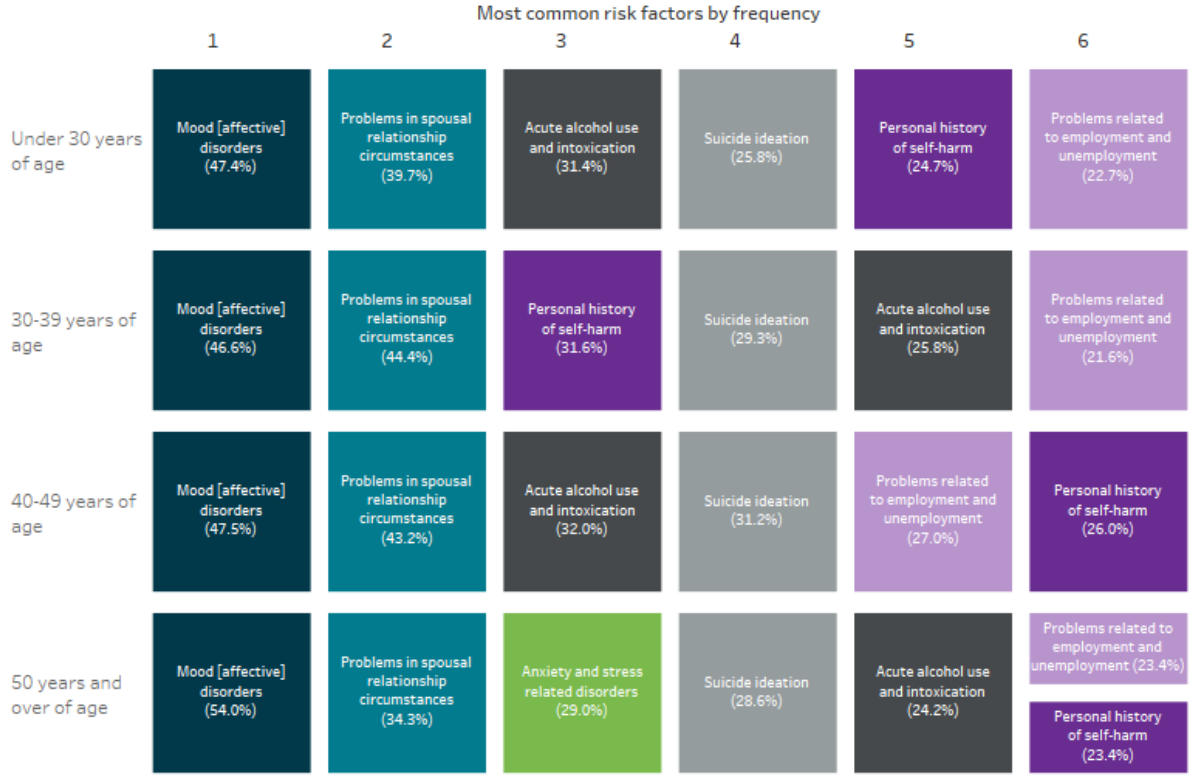


Figure 23(d): Common risk factors identified among ADF males who died by suicide, 2001–2020, by service-related characteristics

Figure 23(e): Common risk factors identified among ADF males who died by suicide, 2001–2020, by service-related characteristics

Figure 23(f): Common risk factors identified among ADF males who died by suicide, 2001–2020, by service-related characteristics

Figure 23(g): Common risk factors identified among ADF males who died by suicide, 2001–2020, by service-related characteristics

This report is the fifth annual update monitoring deaths by suicide among serving and ex-serving Australian Defence Force (ADF) members. The population considered are ADF members who served between 1985 and 2020. Serving male ADF members die by suicide at about half the rate of Australian males. Ex-serving male members have a higher rate than Australian males, with subgroups within the ex-serving population having varying rates of suicide.

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better decisions,
improved health and welfare