



Australian Government  
Australian Institute of  
Health and Welfare

AIHW

**Serving and ex-serving  
Australian Defence  
Force members  
who have served  
since 1985:  
suicide  
monitoring  
2001 to 2019**





**Serving and ex-serving  
Australian Defence Force members  
who have served since 1985:  
suicide monitoring 2001 to 2019**

Australian Institute of Health and Welfare  
Canberra

Cat. no. PHE 290

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# Summary

This is the AIHW's fourth annual report on suicide among permanent, reserve and ex-serving ADF members. Previous editions included members with at least one day of ADF service since 1 January 2001. The current report expands on this earlier work by including members with at least one day of ADF service since 1 January 1985, following extensive investigation and validation of historical data sources. This more than doubles the population under consideration; 149,000 ex-serving ADF members in addition to the 125,000 ex-serving ADF member population in previous reports.

The larger study population enables more detailed analysis, providing greater insight into the risk and protective factors for suicide within the permanent, reserve and ex-serving populations.

Because the ex-serving population included in this report is more than double that of the previous report, the numbers of suicides reported in this report are larger than previously, however the general patterns including rates of suicide and comparisons with the general Australian population remain similar to previous studies.

This report includes numbers of suicide deaths between 1 January 2001 and 31 December 2019 and rates of suicide from 1 January 2002 to 31 December 2019. Further information on veteran population scope can be found in the [Technical notes](#).

The following groups and risk-factors below outline the high-level summary of results. Please note that the groups can overlap, and should not be seen as mutually exclusive.

## **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 (51% and 48% lower respectively).

## **Ex-serving males and females have a higher risk of suicide**

Overall, ex-serving ADF members are at a higher risk of suicide than other Australians, with males 24% more likely to die by suicide, and females 102% more likely (or about twice as likely). However, some subgroups of the ex-serving ADF members have different rates of suicide.

## **Members who separate voluntarily have lower rates of suicide**

The suicide rate for ex-serving males who separate voluntarily is around one third of the rate of those who separate for involuntary medical reasons (73.1 compared with 22.2 per 100,000 population per year).

### **Younger age groups are at greater risk of suicide**

Ex-serving males aged under 50 were more likely to die by suicide than those aged over 50 years (35.2 compared with 18.9 per 100,000 population per year).

### **Those who separate as commissioned officers have lower rates of suicide**

The suicide rate for ex-serving males who separated as commissioned officers is about half the rate of those who separated at any other rank (15.5 compared with 31.8 per 100,000 population per year).

### **Those with a longer length of service have lower rates of suicide**

The suicide rate for males who served for more than 20 years was about one third of the rate of those who served for less than a year (15.4 compared with 46.4 per 100,000 population per year).

### **Time since separation is not a key factor**

Regardless of the length of time since separation, the rate of suicide for ex-serving males is similar.





# About this report

## Background

In 2014, the Department of Veterans' Affairs (DVA) and the 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. As part of this partnership, AIHW has worked with the Department of Defence to link information from Defence personnel systems to a variety of health and welfare data sources to better understand the characteristics of all veterans including 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 level of suicide of permanent, reserve and ex-serving ADF members. In addition, recent government strategic priorities have highlighted that improvements to data and evidence-based research are essential enablers of effective suicide prevention, with all agencies and levels of government having a role to play in strengthening these (National Suicide Prevention Adviser 2020). This report is the fourth annual update.

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 started on 1 January 2001. To build a more comprehensive picture of the ex-serving population, DVA commissioned AIHW to investigate the feasibility of using data from earlier Defence personnel systems and other sources. 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 has been established and is used for the first time in this report. More information about this process is contained in the Technical notes.

AIHW acknowledges that the data presented in this report represents 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 all ADF members who have served at least one day in the ADF since 1 January 1985 and who died by suicide between 1 January 2001 and 31 December 2019.

Serving and ex-serving Australian Defence Force members who have served since 1985:  
suicide monitoring 2001 to 2019

In this report, the term 'ADF members' collectively refers to the three categories of 'currently serving permanent', 'active and inactive 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. In previous reports, permanent ADF members were referred to as serving—there has however been no methodological change and the term is comparable to previous reports.

As of 31 December 2019, almost 373,500 Australians had served at least one day in the ADF between 1 January 1985 and 31 December 2019. Of these, just over 358,000 were still alive of which 59,000 were permanent, 38,700 reserve and nearly 261,000 ex-serving.

The previous report was based on ADF members with at least one day of service since 1 January 2001 who died by suicide between 1 January 2001 and 31 December 2018. The expansion to the larger population provides results that are more representative of the ex-serving ADF population. The larger study population allows for more detailed analysis of subgroups. Care should be taken in directly comparing data in this report with previous AIHW publications due to the larger study population.

Information in this report is presented by age, sex, rank, length of service, time since separation and reason for separation.

### **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) from 1 January 1985, and serving in a permanent capacity on 31 December 2019 or when they died.

**Reserve:** ADF members in the reserve forces for the Navy, Army or the Air Force from 1 January 1985 and who were in the reserve forces on 31 December 2019 or when they died. Most members leaving full-time service transition to the reserves (for a minimum of five years), unless prevented by medical or other reasons. The service status 'Reserve' includes members with a wide range of different experience and relationships to the ADF. For example, it includes personnel who have transitioned from full time service as well as both those who have joined in reserve capacity. Members provide service across a service spectrum that is based on their availability to render service. Some members may not render service in any capacity due to their personal circumstances, however they are liable to be called on by Government.

**Ex-serving:** ADF members in the fulltime or reserve services between 1 January 1985 and 31 December 2019, but who subsequently transitioned from Defence.

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

- use of the expanded population, meaning that deaths by suicide from 2001 to 2019 for those who separated between 1985 and 2001 are included for the first time.
- 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](#).

**If you need help or support, please contact:**

Open Arms - Veterans and Families Counselling **1800 011 046**, or <[www.openarms.gov.au](http://www.openarms.gov.au)>

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ADF Mental Health Services <<https://www1.defence.gov.au/adf-members-families/health-well-being/garrison/adf-mental-health-services>>

Lifeline **13 11 14**, or <[www.lifeline.org.au](http://www.lifeline.org.au)>

Suicide Call Back Service **1300 659 467**, or <<https://www.suicidecallbackservice.org.au>>

Beyondblue Support Service **1300 22 4636**, or <[www.beyondblue.org.au](http://www.beyondblue.org.au)>

**For information on support provided by DVA, see:**

<<https://www.dva.gov.au/health-and-treatment/injury-or-health-treatments/mental-health-care/mental-health-support-services>>

<<https://www.dva.gov.au/health-and-treatment/injury-or-health-treatments/mental-health-care/free-mental-health-care-veterans>>

## Notes on measuring death by suicide

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

- Actual numbers of suicides are presented to give an indication of the total number.
- Suicide rates are reported to compare between groups within the permanent, reserve and ex-serving population to take into account the size of the underlying population.
- Age-adjusted suicide rates or Standardised Mortality Ratios (SMRs) are used to compare rates of suicide between groups with different age structures such as comparing the permanent, reserve and ex-serving populations with the general Australian population.

Confidence intervals (CIs) are used to assess the uncertainty in suicide rates due to fluctuations that may occur in the number of suicides over time. Narrower confidence intervals indicate more certainty in the result, and the difference between two rates is statistically significant when the confidence intervals don't overlap.

The increased population size in this report means that greater confidence can be attached to consistently observed differences between different groups and therefore confidence intervals are smaller than in previous reports.

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 2019, almost 373,500 Australians had served at least one day in the ADF since 1 January 1985. Of these, just over 358,000 still alive of which 59,000 were permanent, 38,700 reserve and nearly 261,000 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 of this cohort had separated and by the end of 2019 this had grown to nearly 274,000. 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 permanent, reserve and ex-serving populations have different demographics to the Australian population. While the Australian population is 50% male, the permanent, reserve and ex-serving populations are 84% male.

The permanent, reserve and ex-serving populations also have different age structures with median ages of 31, 37 and 50 years respectively compared with 38 years for 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

This section presents suicide rates, age-adjusted suicide rates and numbers of deaths by suicide between 2002 and 2019 broken down by the three 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 study population to include those who have served since 1985, the suicide rates remain similar. This indicates that the overall patterns in suicide risk remain the same.

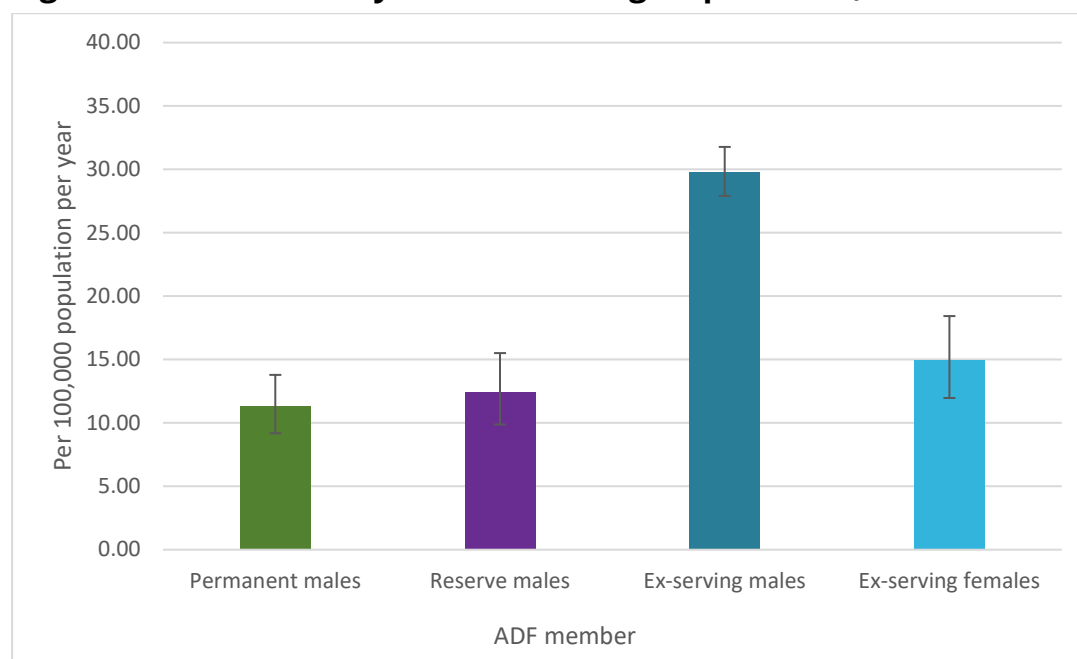
### How do suicide rates vary by service status and sex?

For those with service since 1985, the suicide rate was highest for ex-serving males. Suicide rates between 2002 and 2019 by service status and sex were as follows:

- 11.3 per 100,000 population per year for permanent males
- 12.5 per 100,000 population per year for reserve males
- 29.8 per 100,000 population per year for ex-serving males
- 14.9 per 100,000 population per year for ex-serving females.

Due to the small number of suicide deaths among females in permanent and reserve service, suicide rates are not reported for these subgroups.

**Figure 1: Suicide rate by service status group and sex, 2002–2019**



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

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

Between 2001 and 2019 there were 1,273 certified deaths by suicide among members with ADF service since 1 January 1985. Of these, 1,062 (83%) occurred among ex-serving members, 121 among permanent members and 90 among reserves. This is presented in Table 1.

**Table 1: Total number of deaths by suicide, ADF members and Australian population, 2001–2019**

	<b>Males</b>	<b>Females</b>	<b>Persons</b>
<b>Permanent</b>	114	7	121
<b>Reserve</b>	85	5	90
<b>Ex-serving</b>	970	92	1,062
<b>All ADF members</b>	1,169	104	1,273
<b>Australian population<sup>(a)</sup></b>	37,402	11,542	48,944

(a) 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 1985–2019. AIHW suicide and self-harm monitoring report data 2001–2019.

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 S2.2.

When interpreting Table 2, it is important to remember that the ex-serving population increases each year as described in Box 2. (For population sizes by year see Supplementary tables S8.2 to S8.4)

**Table 2: Number of deaths by suicide, ADF service status groups, 2001–2019**

Year	Permanent and reserve	Ex-serving	Total in all ADF service groups <sup>(a)</sup>
2001	18	47	65
2002	14	37	51
2003	8	51	59
2004	12	44	56
2005	n.p.	n.p.	51
2006 <sup>(b)</sup>	n.p.	n.p.	42
2007 <sup>(c)</sup>	11	49	60
2008	9	50	59
2009	13	46	59
2010	13	61	74
2011	11	62	73
2012	8	53	61
2013	12	56	68
2014	14	66	80
2015	10	71	81
2016	15	76	91
2017	15	70	85
2018	6	68	74
2019	11	73	84
<b>Total</b>	211	1,062	1,273

*n.p.* Not available for publication but included in totals where applicable, unless otherwise indicated.

(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 Technical notes.

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Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

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

After adjusting for age differences (using calculated 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 population.

Due to the small number of suicide deaths among females in permanent and reserve service, suicide rates are not reported for these subgroups.

Compared with the Australian population, suicide rates between 2002 and 2019 were:

- 51% lower for permanent males
- 48% lower for reserve males
- 24% higher for ex-serving males
- 102% (or 2.02 times) higher for ex-serving females.

Unlike suicide rates, these SMRs cannot be used to compare suicide rates between service groups or across time. This is due to the fact that each SMR is a measure that provides a comparison that is specific to the two populations involved, see [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 between 7.4 deaths per 100,000 population per year in 2005–2007 and 12.3 in 2017–2019, which was not statistically significant.
- the suicide rate for males in the reserves remained relatively constant between 8.4 deaths per 100,000 population per year in 2003–2005 and 13.3 in 2017–2019, which was not statistically significant.
- the suicide rate for ex-serving males remained relatively constant between 25.8 in 2005–2007 and 33.2 in 2014–2016. In the most recent 3-year period (2017–2019), the rate for this group was 30.2 deaths per 100,000 population per year. These fluctuations were not statistically significant.

- the suicide rate for ex-serving females has remained relatively constant, however due to small numbers has fluctuated between 7.5 in 2003–2005 and 16.0 deaths per 100,000 population per year in 2017–2019, which was not statistically significant.

The rates of suicide for males and females for the Australian general population are presented in the final two graphs of this section for comparison.

*Please note: The graph below is an image of an interactive graph available in the online version of this report. See Appendix for other data selections available for rates of suicide*

**Figure 2: Rate of suicide by service status and sex, 2002-2004 to 2017-2019**

Select which data you wish to view below and hover over a data point for detailed information.

Select service category

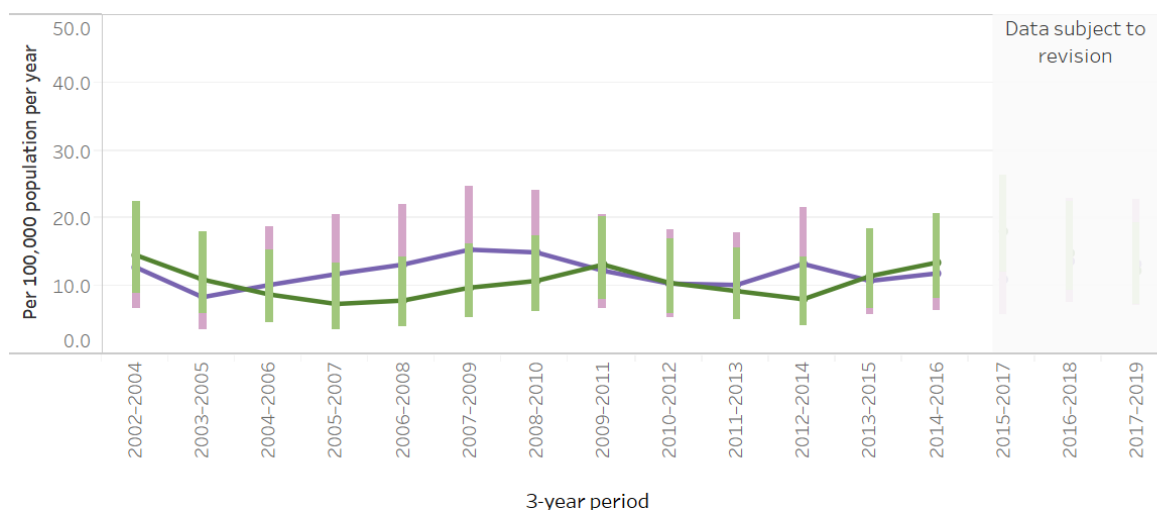
- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

Compare to

- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

Show confidence interval?

- Yes
- No

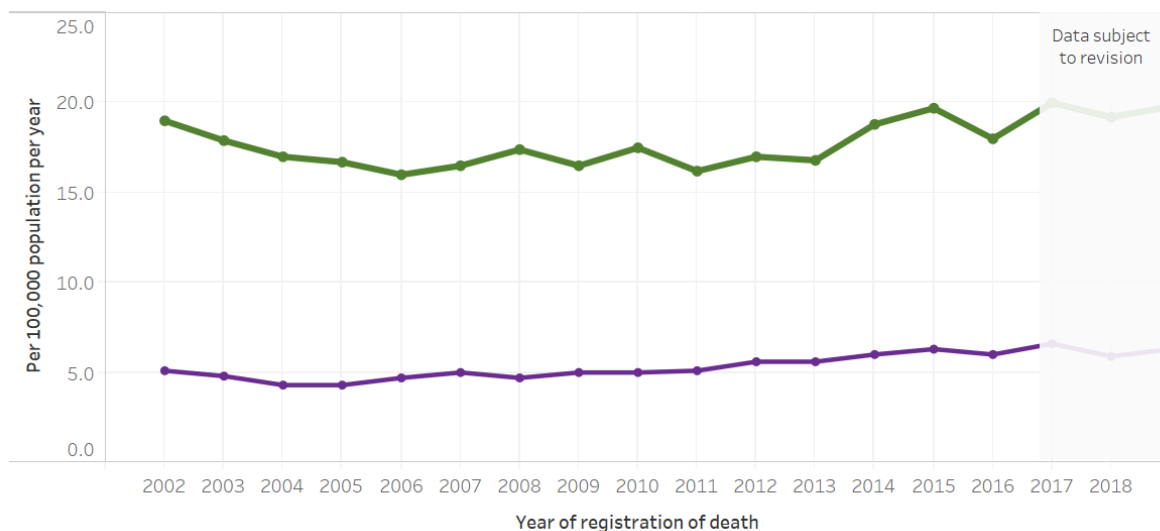


Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

*Note:* The confidence intervals in this figure can be used to determine the significance of differences between the suicide rates calculated for the ADF within a given 3-year period. However, they *cannot* be used to determine the significance of differences 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, 2002-2019**

Hover over a data point for detailed information.



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

Australian Population  
■ Males ■ Females

Source: AIHW suicide and self-harm monitoring report data 2001–2019.  
<http://www.aihw.gov.au>

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

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

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**For information on support provided by DVA see:**

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<<https://www.dva.gov.au/health-and-treatment/injury-or-health-treatments/mental-health-care/free-mental-health-care-veterans>>

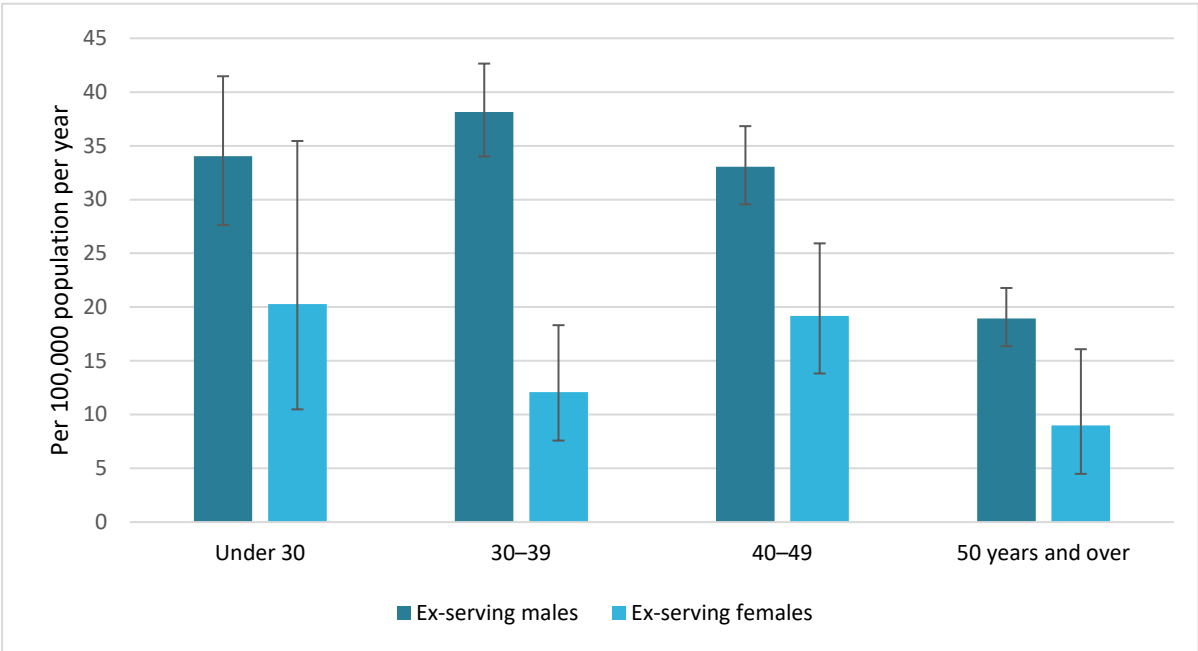
# Suicide rates by age

## Ex-serving males and females

The suicide rates for both ex-serving males and females between 2002 and 2019 varied by age at time of suicide death.

Between 2002 and 2019, the suicide rate for ex-serving males aged 50 years and over was lower than ex-serving males under 50 years of age (18.9 and 35.2 per 100,000 population per year). However, ex-serving females suicide rates were similar regardless of age at suicide death.

**Figure 4: Suicide rate by age group, ex-serving males and females, 2002–2019**



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

## 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 age groups under 50. For those under 30, the suicide rate was three times higher for ex-serving females and almost twice as high for ex-serving males. As previously, comparisons are made here with the Australian population to provide context.

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**Table 3: Suicide rate by age group, ex-serving males and Australian males, 2002–2019**

Age group	Male ex-serving suicide rate (per 100,000 population per year)	Male Australian suicide rate (per 100,000 population per year)	Significant difference to Australian population
Under 30	34.0	20.2	Yes, Higher
30–39	38.1	25.5	Yes, Higher
40–49	33.0	26.3	Yes, Higher
50 years and over	18.9	20.6	No

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

**Table 4: Suicide rate by age group, ex-serving females and Australian females, 2002–2019**

Age group	Female ex-serving suicide rate (per 100,000 population per year)	Female Australian suicide rate (per 100,000 population per year)	Significant difference to Australian population
Under 30	20.3	6.6	Yes, Higher
30–39	12.1	7.4	Yes, Higher
40–49	19.2	8.6	Yes, Higher
50 years and over	9.0	6.6	No

Source: AIHW analysis of linked Defence historical personnel data– PMKeyS–NDI data 1985–2019.

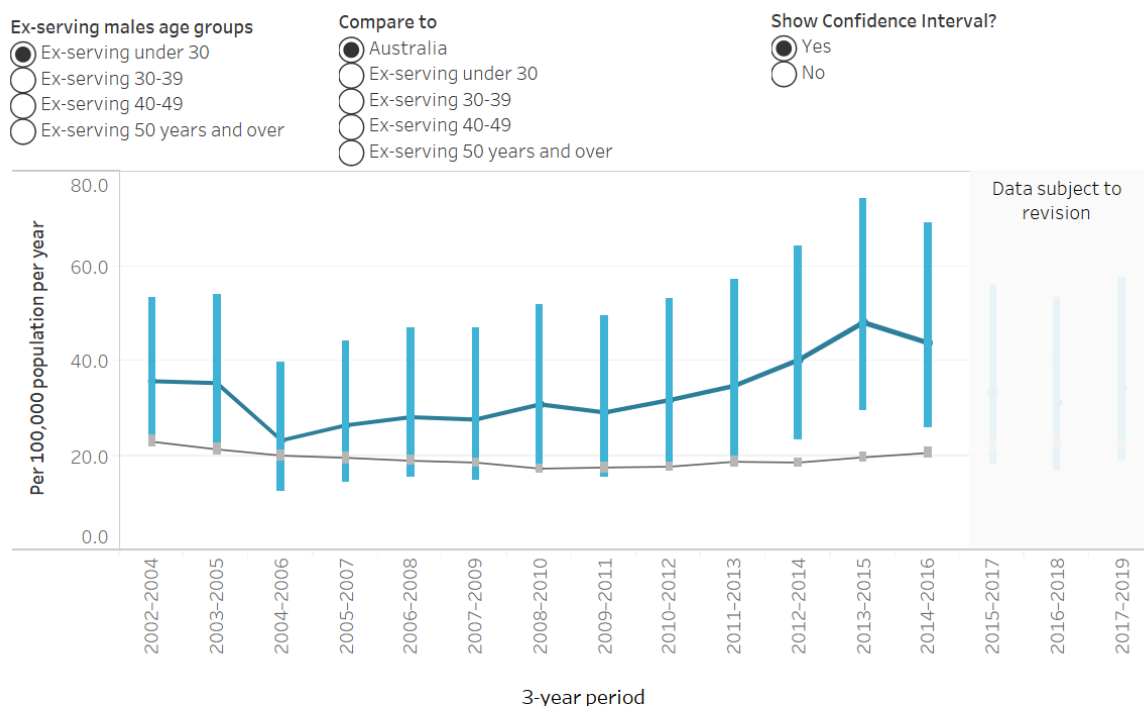
## Suicide rate by age over time

There is some fluctuation over time in the suicide rates by age group, however the majority of differences are not statistically significant. There has, however, been an increase in the suicide rates for ex-serving males aged 30–39 years from 27.9 in 2012–2014 to 49.9 per 100,000 population per year in 2017–2019.

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

*Please note: The graph below is an image of an interactive graph available in the online version of this report. See Appendix for other data selections available for rates of suicide*

**Figure 5: Rate of suicide, ex-serving and Australian males by age, 2002-2004 to 2017-2019** Select which data you wish to view below and hover over a data point for detailed information.



Source: AIHW analysis of linked Defence historical personnel data– PMKeyS–NDI data 1985–2019.  
<http://www.aihw.gov.au>

*Note:* The confidence intervals in this figure can be used to determine the significance of differences between the suicide rates calculated for the ex-serving and Australian populations within a given 3-year period. However, they *cannot* be used to determine the significance of differences between rates calculated for the ex-serving (or Australian) population for overlapping 3-year time periods (for example 2002–2004 and 2003–2005).

Data underlying this graph are available in Supplementary table S6.2. 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 suicide death.

**Table 5: Male suicide rate by age group and service status, 2002–2019**

Age group <sup>(a)</sup>	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)
<b>Under 30</b>	12.6	11.3	34.0
<b>30–39</b>	9.9	14.6	38.1
<b>40 years and over</b>	10.3	11.8	37.1
<b>40–49</b>	n.p.	12.8	33.0
<b>50 years and over</b>	n.p.	10.7	18.9

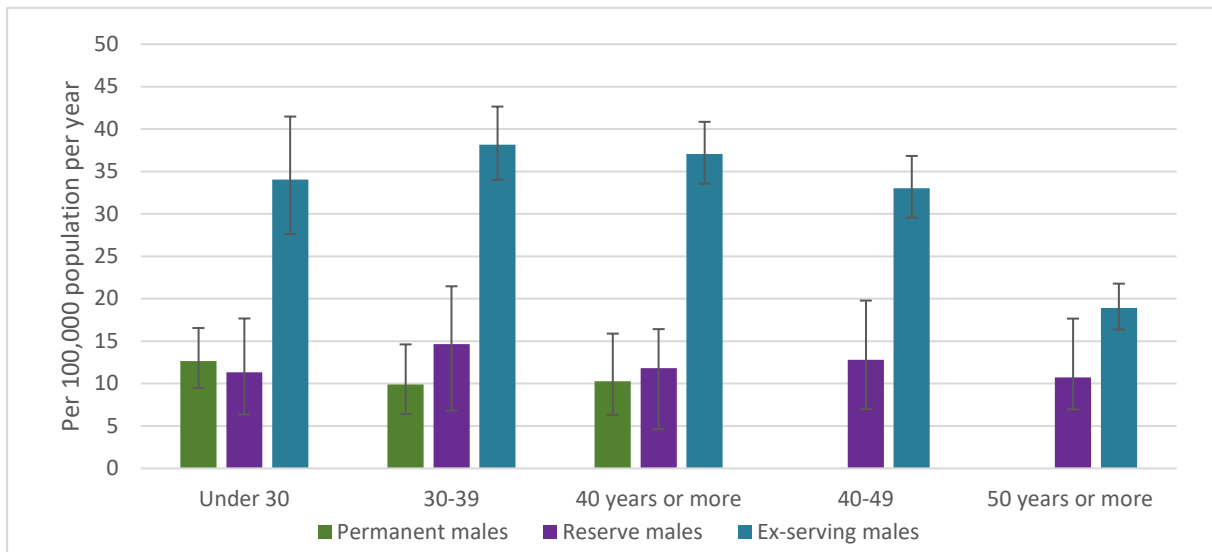
*n.p.* Not available for publication but included in totals where applicable, unless otherwise indicated.

(a) Due to the small number of suicide deaths among permanent males at the older ages, the upper age limit is presented at 40 years and over as the data was unable to be disaggregated further.

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.



**Figure 6: Male suicide rate by age group and service status, 2002–2019**



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

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

**If you need help or support, please contact:**

Open Arms - Veterans and Families Counselling **1800 011 046**, or <[www.openarms.gov.au](http://www.openarms.gov.au)>

Open Arms Suicide Intervention page <<https://www.openarms.gov.au/get-support/suicide-intervention>>

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Serving and ex-serving Australian Defence Force members who have served since 1985: suicide monitoring 2001 to 2019

## Suicides by Service

The ADF comprises three Services: the Royal Australian Navy (Navy), Australian Army (Army) and the Royal Australian Air Force (Air Force). An individual can serve in more than one service during their ADF career, and individuals can transfer between Services throughout. This section describes the Service at the time of separation for ex-serving members.

The majority of ex-serving members were in the Army at the time of separation (68.4% for males and 62.5% for females). At the same time, 16.0% of males and 17.8% of females were in the Navy, and 15.5% of males and 19.7% of females were in the Air Force.

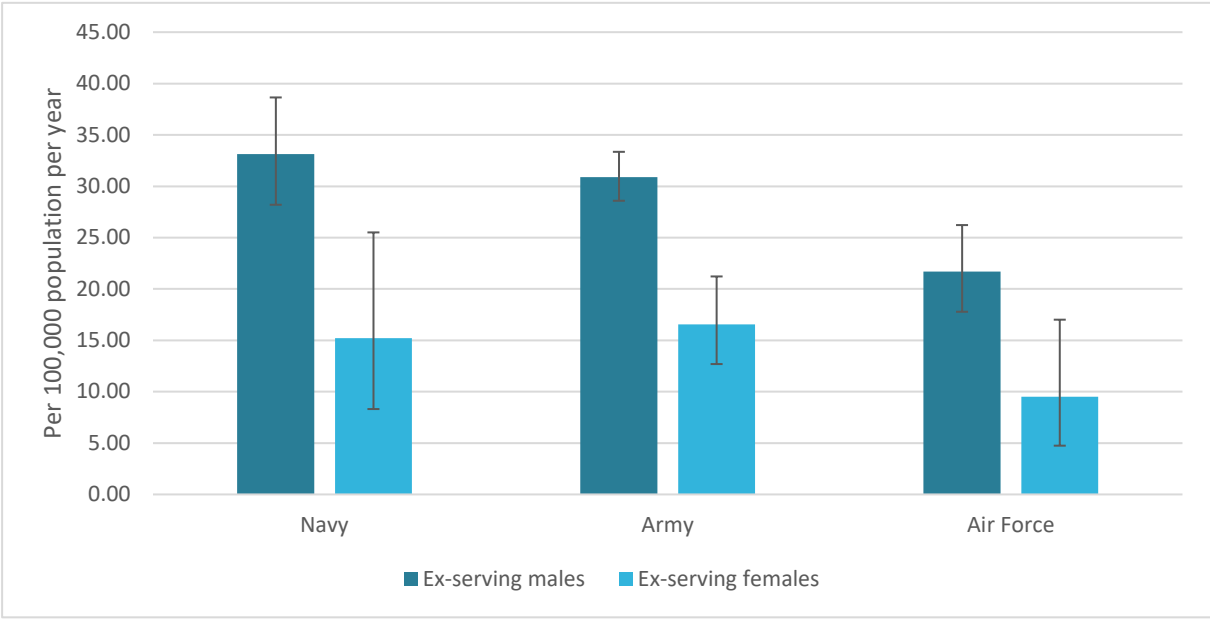
The rates of suicide for ex-serving females were similar across the three Services. However, the rate of suicide for ex-serving males who separated from the Air Force was lower than for ex-serving males who separated from the Army or the Navy.

**Table 6: Suicide rates by Service, ex-serving males and females, 2002–2019**

	Ex-serving males	Ex-serving females
Service	Suicide rate per 100,000 population per year	Suicide rate per 100,000 population per year
Navy	33.1	15.2
Army	30.9	16.6
Air Force	21.7	9.5

Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

**Figure 7: Suicide rate by Service, ex-serving males and females, 2002–2019**



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

**Suicide rate by Service over time**

The following graphs show how suicide rates for ex-serving males by Service vary over time. While there is some fluctuation, small numbers mean that there are no significant differences.

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

*Please note: The graph below is an image of an interactive graph available in the online version of this report. See Appendix for other data selections available for rates of suicide.*

**Figure 8: Rate of suicide for ex-serving males by Service, 2002-2004 to 2017-2019.**

Select which data you wish to view below and hover over a data point for detailed information.

Select service category

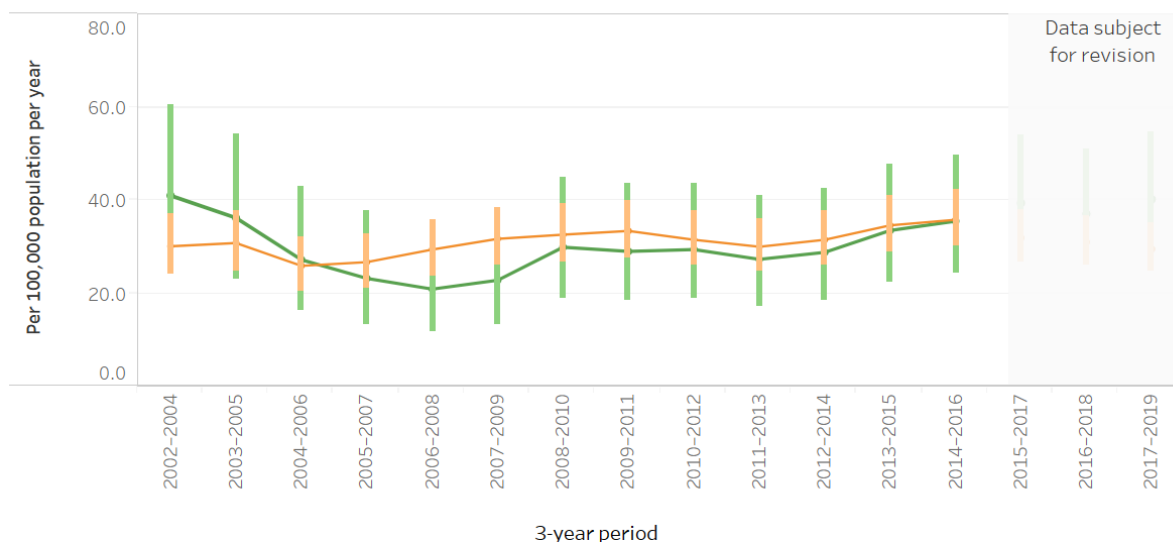
- Navy males
- Army males
- Air Force males

Compare to

- Navy males
- Army males
- Air Force males

Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

Note: The confidence intervals in this figure can be used to determine the significance of differences between the suicide rates calculated for the ex-serving within a given 3-year period. However, they *cannot* be used to determine the significance of differences between rates calculated for the ex-serving population for overlapping 3-year time periods (for example 2002-2004 and 2003-2005).

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

Please note, data for more recent years are subject to change; see [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 three broad groups:

- voluntary separation
- other involuntary separation
- involuntary medical separation

The separation point used in this report reflects full separation from the ADF, that is, when a member is no longer permanent or reserve. Separation reason is therefore the reason recorded for leaving the 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 40% of the total ex-serving members with at least 1 day of service since 1 January 1985.

The most common reason for separation from the ADF was voluntary separation with the proportions similar for males and females at 44.8% and 44.7 respectively. This was followed by other involuntary reasons (males 31.0% and females 24.6%) and involuntary medical reasons (males 14.0% and females 17.1%).

Between 2003 and 2019, the suicide rate for ex-serving males by reason for separation was lowest for those who separated voluntarily (22.2 per 100,000 population per year) and highest for those whose reason for separation was involuntary medical (73.1 per 100,000 population per year). In addition ex-serving males who separated voluntarily from the ADF have a similar rate of suicide as the Australian males (22.4 compared to 22.2 per 100,000 population per year).

**Table 7: Suicide rates by reason for separation, ex-serving males and females, 2003–2019**

	<b>Ex-serving males</b>	<b>Ex-serving females</b>
<b>Reason for separation<sup>(a)</sup></b>	<b>Suicide rate per 100,000 population per year</b>	<b>Suicide rate per 100,000 population per year</b>
<b>Voluntary</b>	22.2	20.6
<b>Total involuntary<sup>(b)</sup></b>	44.2	17.3
<b>Other involuntary</b>	33.8	n.p.
<b>Involuntary medical</b>	73.1	n.p.

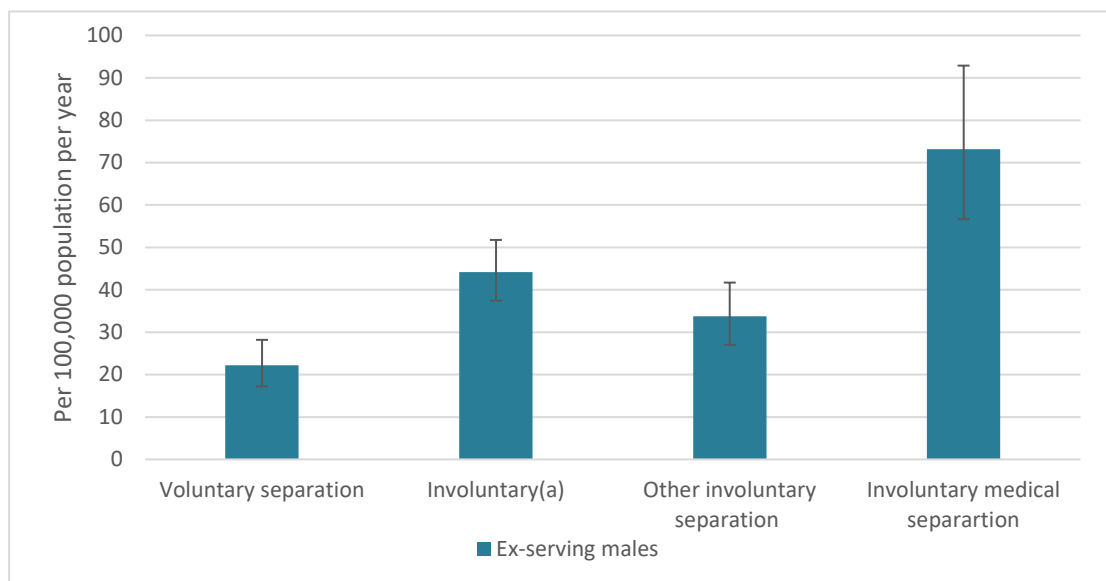
*n.p.* Not available for publication but included in totals where applicable, unless otherwise indicated.

(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 40% of the total ex-serving members with at least 1 day of service since 1 January 1985.

(b) Due to small numbers of suicide deaths, Other involuntary and Involuntary medical separation reasons have been aggregated to produce suicide rates for ex-serving females as a Total involuntary separation reason.

*Source:* AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

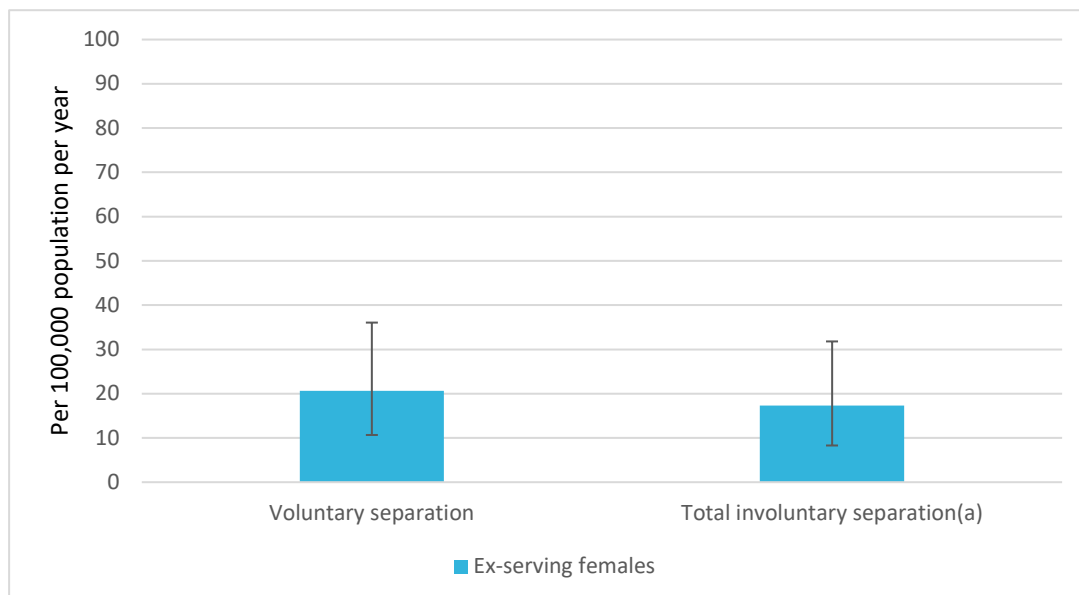
**Figure 9: Suicide rates by reason for separation, ex-serving males, 2003–2019**



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985–2019.

Between 2003 and 2019, the suicide rates for ex-serving females by reason for separation were similar for voluntary separation and involuntary separation (20.6 and 17.3 per 100,000 population per year respectively).

**Figure 10: Suicide rates by reason for separation, ex-serving females, 2003–2019**



Note: Due to small numbers of suicide deaths for ex-serving females, Other involuntary and Involuntary medical separation reasons have been aggregated as Total involuntary separation.

Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985–2019.

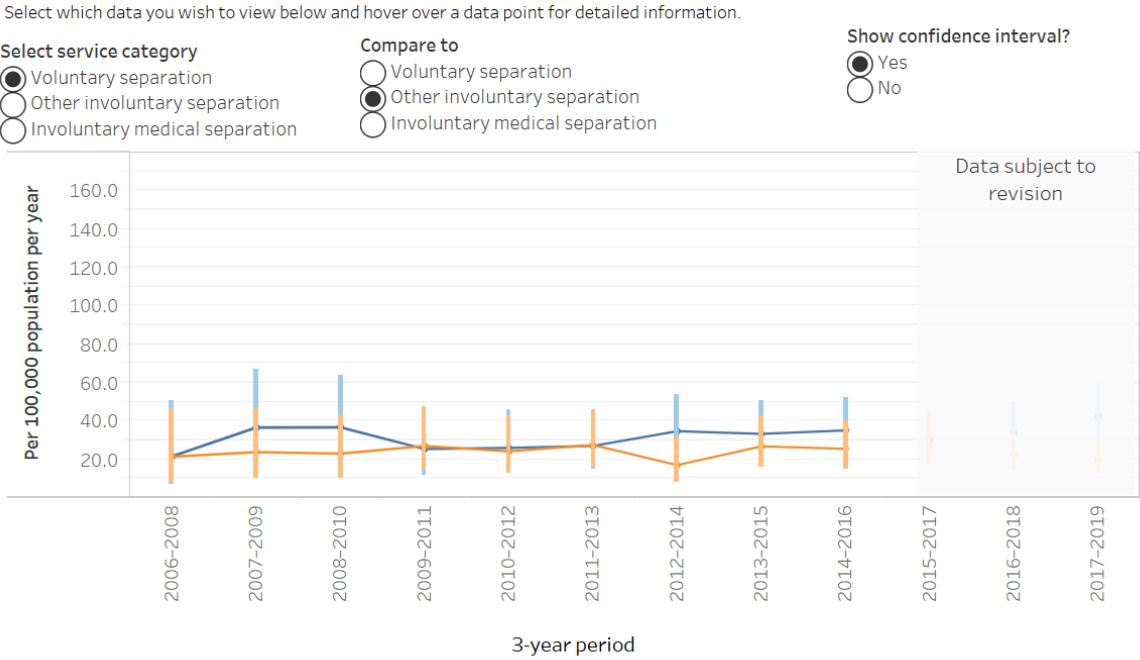
### Suicide rate by reason for separation over time

The following graphs show suicide rates by reason for separation over time for ex-serving males.

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

Please note: The graph below is an image of an interactive graph available in the online version of this report. See Appendix for other data selections available for rates of suicide.

**Figure 11: Rate of suicide for ex-serving males by reason for separation, 2006-2008 to 2017-2019**



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

Note: The confidence intervals in this figure can be used to determine the significance of differences between the suicide rates calculated for the ex-serving population within a given 3-year period. However, they cannot be used to determine the significance of differences between rates calculated for the ex-serving 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 [Technical notes](#) for further detail.

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<<https://www.dva.gov.au/health-and-treatment/injury-or-health-treatments/mental-health-care/free-mental-health-care-veterans>>

## Suicides by length of service

Length of service describes the time between joining the ADF and separation<sup>1</sup>. In this report, length of service is presented in five groups (ranging from less than 1 year to more than 20 years).

The overall average length of service was just over 10 years. The proportions of ex-serving males and females into varying length of service comprised:

- 13.3% of males and 17.5% of females had served less than 1 year.
- 26.4% of males and 32.1% of females had between 1 and 5 years of service.
- 18.2% of males and 21.3% of females had between 5 and 10 years of service.
- 18.8% of males and 18.8% of females had between 10 and 20 years of service.
- 22.8% of males and 9.9% of females having served over 20 years.

The average length of service was higher for males than females (11.2 years and 7.8 years respectively).

Suicide rates for ex-serving males decrease as length of service increases. The suicide rate was lowest for males who served more than 20 years (15.4 per 100,000 population per year) and highest for those who had served less than one year (46.4 per 100,000 population per year).

For ex-serving females, rates of suicide were similar for all lengths of service.

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<sup>1</sup> 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. For example, a member who transitions from full time service to the inactive reserves is counted as permanent for the purpose of length of service calculations until he or she separates from the reserves.

**Table 8: Suicide rate by length of service, ex-serving members, 2002–2019**

	Ex-serving males	Ex-serving females
<b>Length of service (years)<sup>(a)</sup></b>	<b>Suicide rate per 100,000 population per year</b>	<b>Suicide rate per 100,000 population per year</b>
<b>&lt;1</b>	46.4	18.9
<b>1–&lt;5</b>	30.3	15.8
<b>5–&lt;10</b>	32.1	14.2
<b>10 or more<sup>(b)</sup></b>	..	10.7
<b>10–&lt;20</b>	29.1	n.p.
<b>20 or more</b>	15.4	n.p.

*n.p.* Not available for publication but included in totals where applicable, unless otherwise indicated.

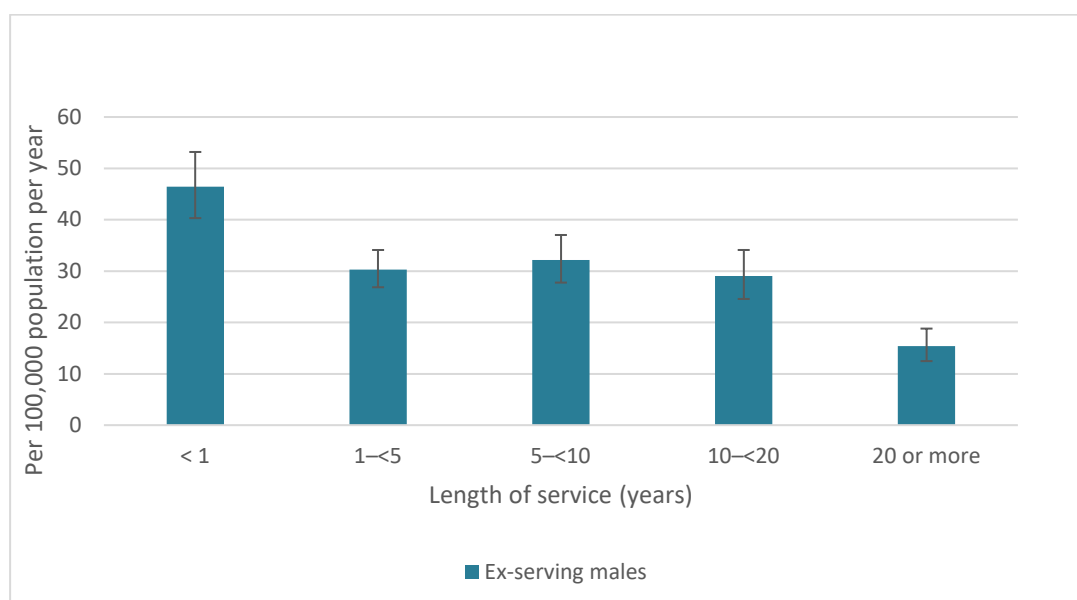
.. Not applicable

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

(b) The 10 or more category was used for ex-serving females because further disaggregation was not possible due to small number of suicide deaths.

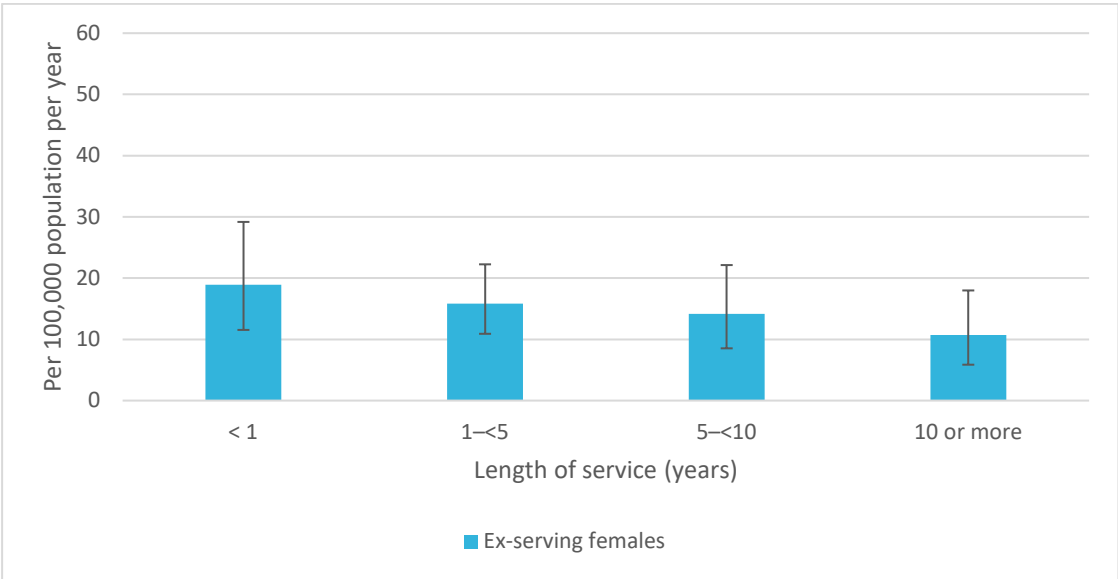
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

**Figure 12: Suicide rate by length of service, ex-serving males, 2002–2019**



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

**Figure 13: Suicide rate by length of service, ex-serving females, 2002–2019**



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985–2019.

**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.

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

*Please note: The graph below is an image of an interactive graph available in the online version of this report. See Appendix for other data selections available for rates of suicide*

**Figure 14: Rate of suicide for ex-serving males by length of service, 2002-2004 to 2017-2019**

Select which data you wish to view below and hover over a data point for detailed information.

Select service category

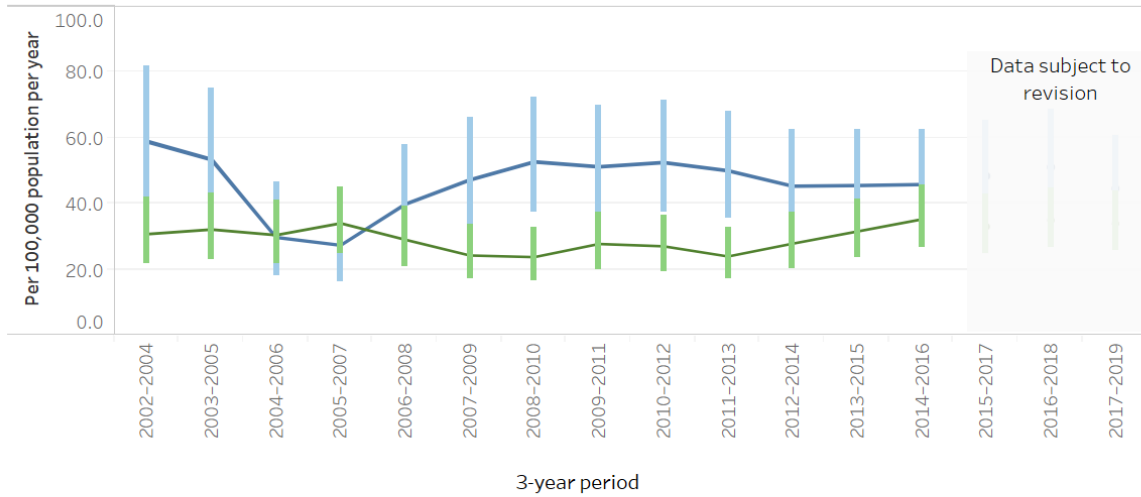
- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Compare to

- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

*Note:* The confidence intervals in this figure can be used to determine the significance of differences between the suicide rates calculated for the ex-serving within a given 3-year period. However, they *cannot* be used to determine the significance of differences between rates calculated for the ex-serving 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 [Technical notes](#) for further detail.

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## 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<sup>2</sup> 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).

Overall, around half of the ex-serving population (49.5% of males and 50.8% of females) who served since 1985, separated from the ADF 20 or more years ago, followed by just under one quarter (23.7% of males and 24% of females) between 10 and 20 years ago. The proportion of the population who separated between 1 and 5 years ago is 13.2% of males, and 11.7% of females. Around 2.5% of males and 2.6% of females separated less than 1 year ago.

**Table 9: Suicide rate by time since separation, ex-serving males and females, 2002–2019**

	Ex-serving males	Ex-serving females
Number of years since separation <sup>(a)</sup>	Suicide rate per 100,000 population per year	Suicide rate per 100,000 population per year
<1	31.3	27.9
1–<5	30.9	10.9
5–<10	28.0	14.6
10–<20	30.2	15.5
20 or more <sup>(b)</sup>	29.7	14.7

(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 scope of the study population, suicide rates for time since separation 20 or more are from 2005–2019.

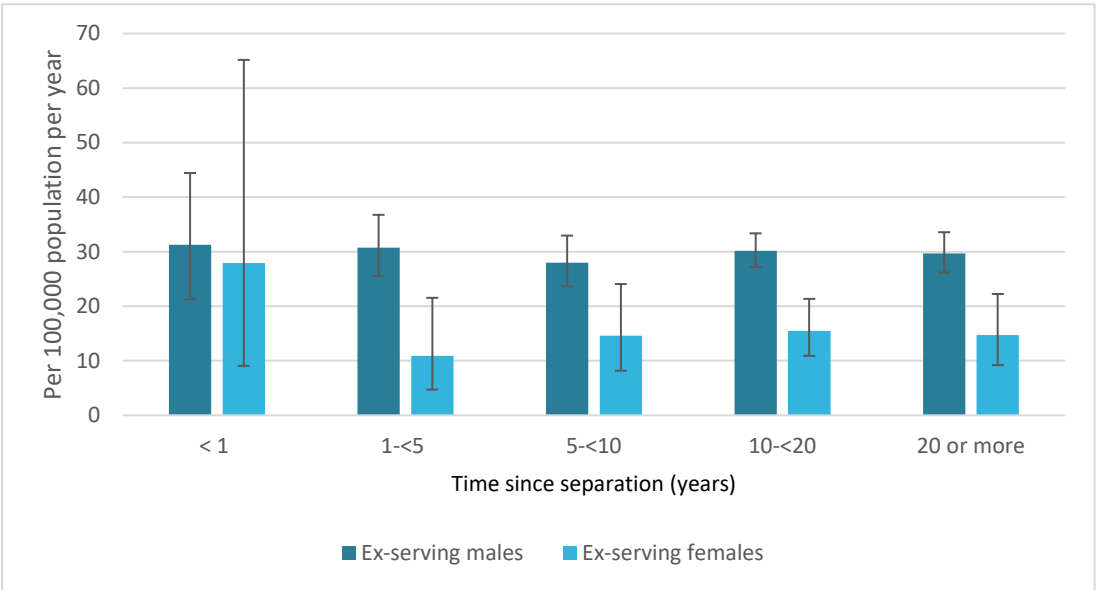
Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

<sup>2</sup> 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. For example, a member who transitions from full time service to the inactive reserves is counted as permanent for the purpose of length of service calculations until he or she separates from the reserves.

The average time since separation was nearly 19 years and was the same for males and females. The maximum length of time since separation that could be observed in this study was 34 years.

The rates of suicide were similar regardless of time since separation for both ex-serving males and females.

**Figure 15: Suicide rate by time since separation, ex-serving males and females, 2002–2019**



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

**Suicide rate by time since separation over time**

Suicide rates over time for ex-serving males by time since separation are presented in the interactive graph below. Note 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.

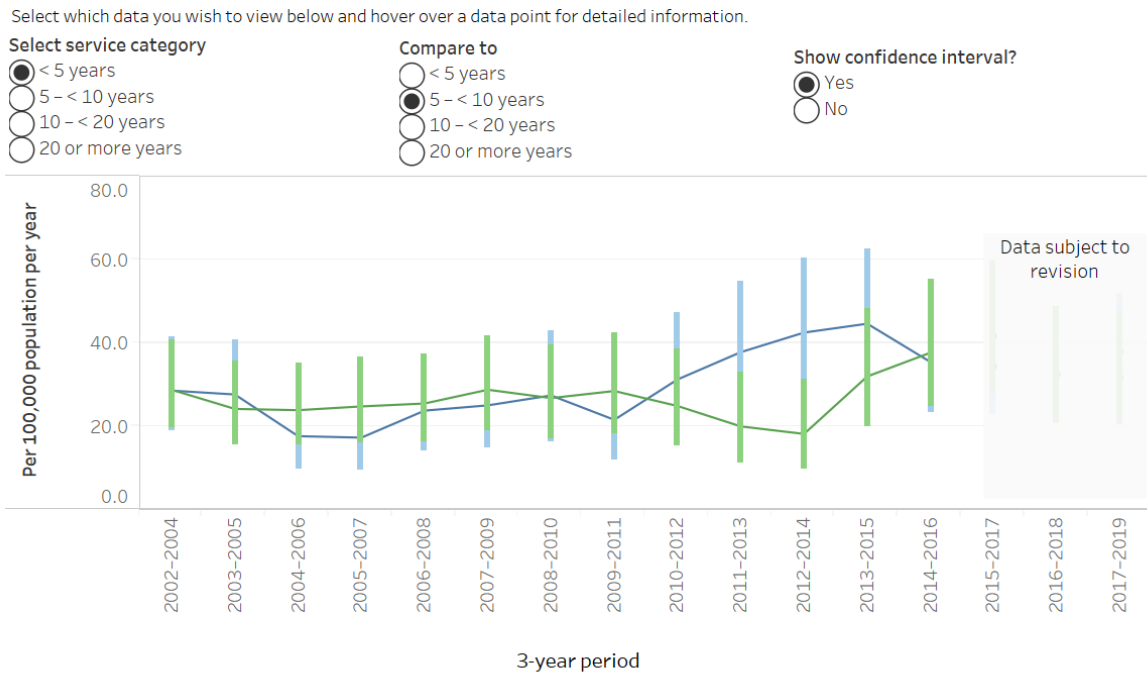
Due to the small number of suicide deaths among ex-serving females, suicide rates over time are not reported.

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

*Please note: The graph below is an image of an interactive graph available in the online version of this report. See Appendix for other data selections available for rates of suicide.*



**Figure 16: Rate of suicide for ex-serving males by time since separation, 2002-20..**



Due to the scope of the study population, suicide rates for time since separation 20 or more years are from 2005-2019.

Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

*Note:* The confidence intervals in this figure can be used to determine the significance of differences between the suicide rates calculated for the ex-serving within a given 3-year period. However, they *cannot* be used to determine the significance of differences between rates calculated for the ex-serving 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.

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<<https://www.dva.gov.au/health-and-treatment/injury-or-health-treatments/mental-health-care/free-mental-health-care-veterans>>

## Suicides by rank

Rank describes organisational and workforce structures that determine a member's position, conditions, opportunities and entitlements (such as pay and conditions). The analysis here is based on rank at time of separation. It is presented in two broad groups: commissioned officers and all ranks other than commissioned officer.

Around 86% of ex-serving males and ex-serving females were in the group "all other ranks" at time of separation. About 1 in 5 (22.5%) males who separated voluntarily were commissioned officers and around 77% of males who voluntarily separated were in the group all other ranks.

**Table 10: Suicide rate by rank, ex-serving males and females, 2002–2019**

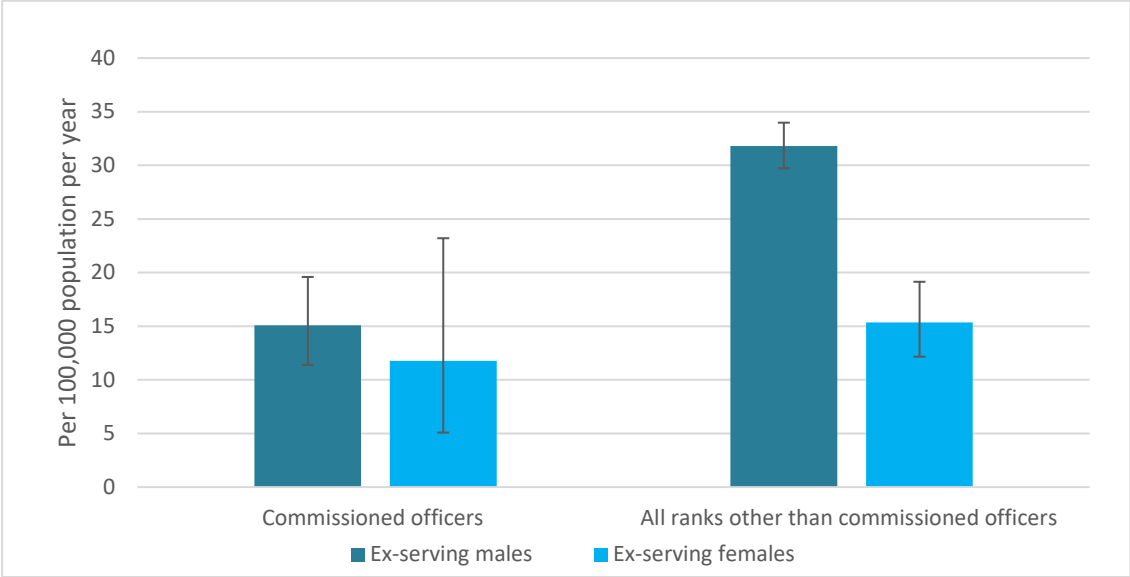
	Ex-serving males	Ex-serving females
Rank at time of separation	Suicide rate per 100,000 population per year	Suicide rate per 100,000 population per year
Commissioned officer <sup>(a)</sup>	15.1	11.8
All ranks other than commissioned officer <sup>(b)</sup>	31.8	15.4

(a) An appointed Defence member who holds a rank of Midshipman or Officer Cadet, or higher.  
 (b) A Defence member who holds a Sailor, Other Ranks or Airman/Airwoman rank.  
 Source: AIHW analysis of linked Defence historical personnel data–NDI data 1985–2019.

Between 2002 and 2019, the suicide rates for ex-serving males who were commissioned officers at the time of separation was half that of those who were all other ranks (15.1 compared with 31.8 per 100,000 population per year).

For ex-serving females, rates of suicide were similar for both commissioned officers and all other rank.

**Figure 17: Suicide rate by rank, ex-serving males and females, 2002–2019**



Source: AIHW analysis of linked Defence historical personnel data–PMKeyS–NDI data 1985–2019.

## Suicide rate by rank over time

Rates of suicide for ex-serving males who separated as all ranks other than commissioned officer show no variation over time.

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.

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

*Please note: The graph below is an image of an interactive graph available in the online version of this report. See Appendix for other data selections available for rates of suicide.*

**Figure 18: Rate of suicide for ex-serving males by rank, 2002-2004 to 2017-2019**

Select which data you wish to view below and hover over a data point for detailed information.

Select service category

Commissioned officer

All ranks other than commissioned officer

Compare to

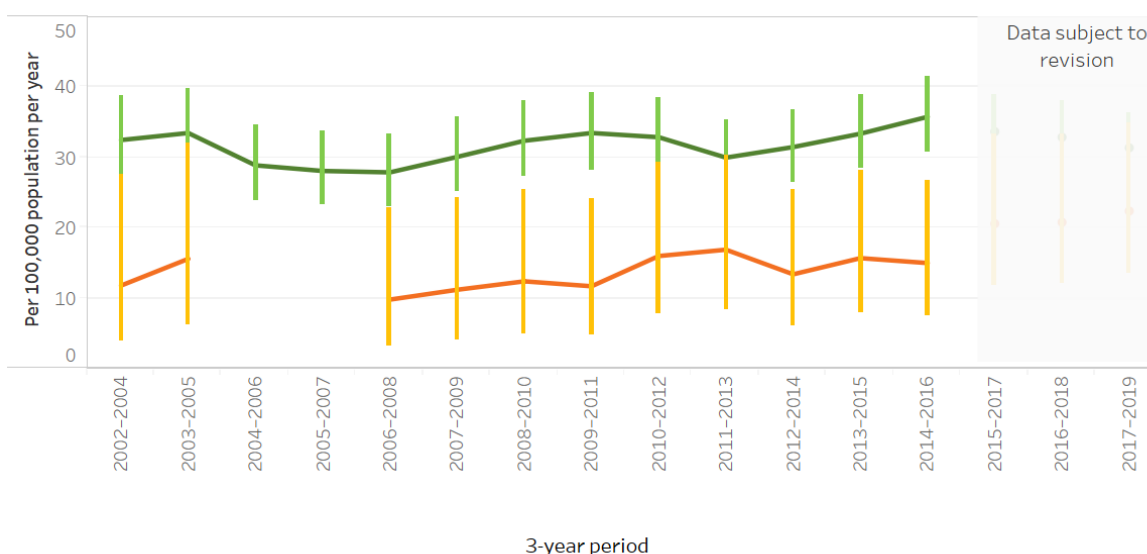
Commissioned officer

All ranks other than commissioned officer

Show confidence interval?

Yes

No



\* 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 a given 3-year period.

Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019

<http://www.aihw.gov.au>

*Note:* The confidence intervals in this figure can be used to determine the significance of differences between the suicide rates calculated for the ex-serving within a given 3-year period. However, they *cannot* be used to determine the significance of differences between rates calculated for the ex-serving 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.

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Open Arms - Veterans and Families Counselling **1800 011 046**, or <[www.openarms.gov.au](http://www.openarms.gov.au)>

Open Arms Suicide Intervention page <<https://www.openarms.gov.au/get-support/suicide-intervention>>

[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 <<https://www1.defence.gov.au/adf-members-families/health-well-being/garrison/adf-mental-health-services>>

Lifeline **13 11 14**, or <[www.lifeline.org.au](http://www.lifeline.org.au)>

Suicide Call Back Service **1300 659 467**, or <<https://www.suicidecallbackservice.org.au>>

Beyondblue Support Service **1300 22 4636**, or <[www.beyondblue.org.au](http://www.beyondblue.org.au)>

**For information on support provided by DVA, see:**

<<https://www.dva.gov.au/health-and-treatment/injury-or-health-treatments/mental-health-care/mental-health-support-services>>

<<https://www.dva.gov.au/health-and-treatment/injury-or-health-treatments/mental-health-care/free-mental-health-care-veterans>>

# Technical notes

## Expanded study population demographics

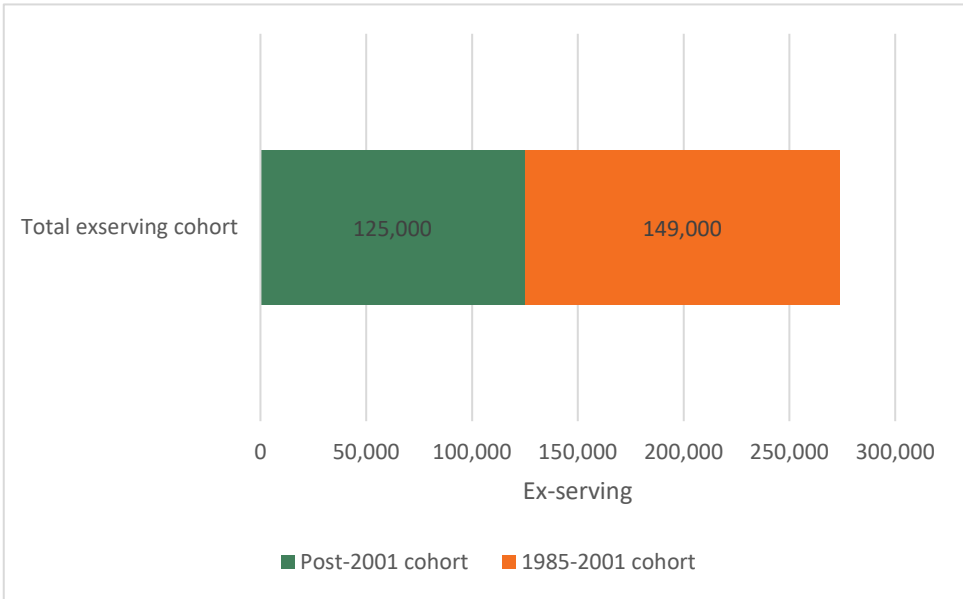
The population used in this report includes all ADF members who have served at least one day since 1 January 1985. As of 31 December 2019, almost 373,500 Australians had served at least one day in the ADF since 1 January 1985. Of these, just over 358,000 were still alive of which 59,000 were permanent, 38,700 reserve and nearly 261,000 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 2019 this had grown to nearly 274,000. 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.

In comparison, the previous version of the report included all ADF members who had served at least one day since 1 January 2001. At 31 December 2019, there were the same numbers of permanent and reserve, however only 125,000 ex-serving. Therefore, the ex-serving population included in this report is more than double that of the previous report.

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.\*](#)

**Figure 19: Ex-serving population totals between 1985 and 2000 and 2000 and 2019, as at 31 December 2019**



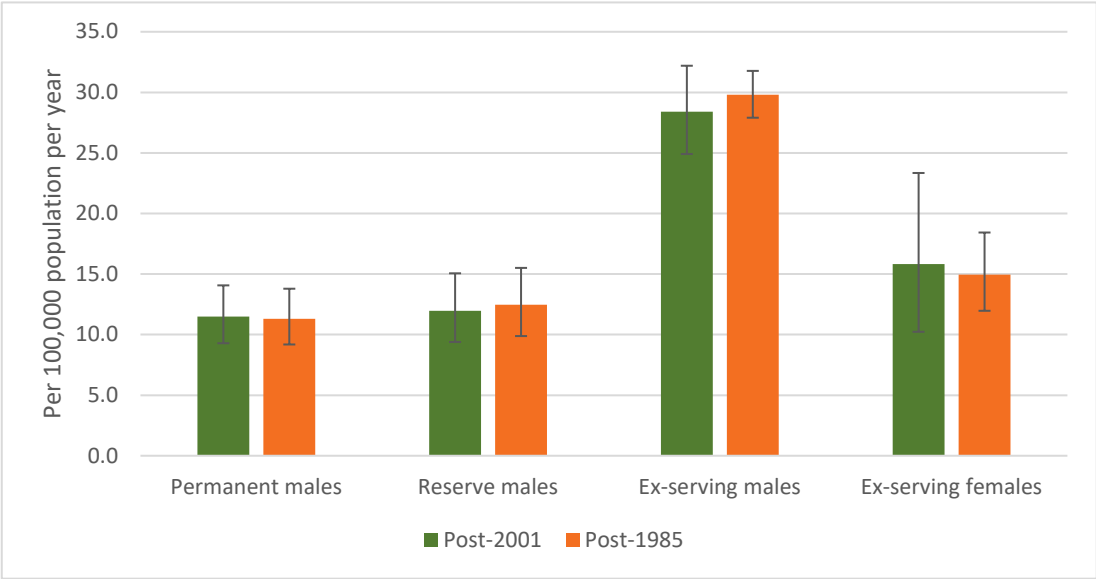
Source: AIHW analysis of linked Defence Historical Personnel data-PMKeyS-NDI data 1985-2019; NMD 2002-2019.

**How does the expanded study population affect the results?**

The increased size of the ex-serving population with the addition of those with service between 1985 and 2000 has resulted in a similar increase in the number of ex-serving deaths by suicide reported. For example, the 2020 update reported a total of 267 ex-serving suicides between 2001 and 2018, whereas 1,062 are reported here (between 2001 and 2019). However, it is important to understand that **this increased suicide count doesn't reflect a higher risk of suicide to the ADF population**. Rather, the number of deaths by suicide identified has increased because we're reporting on deaths from within a much larger group of people.

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's 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 20, the suicide rates have not significantly changed due to the expanded study population. Notice that the width of the confidence intervals for ex-serving males and females have approximately halved with the addition of members with post-1985 service, indicating that the results are more statistically reliable.

**Figure 20: Suicide rates by service status group and sex, post-2001 and post-1985 service, 2002–2019**



Source: AIHW analysis of linked Defence Historical Personnel data–PMKeyS–NDI data 1985–2019; NMD 2002–2019; Defence population snapshots, 2002–2019.

**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 808 suicide deaths are reported here compared to the 2020 update. The breakdown of changes in the number of suicide deaths reported is as follows:

- 717 suicide deaths between 2001 and 2018 in members who separated between 1 January 1985 and 31 December 2001 (and were therefore previously out of scope)
- 84 suicide deaths that occurred in 2019
- 6 additional suicides in 2018 due to lag in reporting cause of death
- 1 additional suicide in 2017 due to a change in the reported cause of death from unspecified to suicide

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- 1 additional suicide death was identified in 2015 due to an update in the Defence Suicide Database
- less 1 death in 2016 that was reported as a suicide in the 2020 report but has since been recoded to a different cause of death
- 1 suicide death for which the year of death was updated from 2014 to 2015 in the National Death Index (NDI).

As well as the expansion of the study population 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 *National suicide monitoring of serving and ex-serving Australian Defence Force personnel: 2020 update* for deaths that occurred in 2018 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 2018 at the time of publishing the *National suicide monitoring of serving and ex-serving Australian Defence Force personnel: 2020 update*, cause of death information was missing for a number of deaths included in the analysis at that time. Additional suicides that occurred in 2018 but that were not registered until 2019 have now been identified with the inclusion of preliminary 2019 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: suicide monitoring 2001 to 2019* release is based on final cause of death information for the years 2001 to 2016. Revised data are used for 2017 and preliminary data for 2018 and 2019. Cause of death for a small number of records linked to the 2017 (revised), 2018 (preliminary) and 2019 (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 2019 and added to 2017 or 2018). 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 is possible that the total ex-serving population is slightly underestimated. However, investigations showed that identifying rehires made less than 1% difference to the total ex-serving population in every year.

## **Time since separation**

The study population used in this report comprises all members with ADF service since 1 January 1985, whereas suicide rates are calculated from 2002 to 2019. This gap between the beginning of the study period (1985) and the start of the reporting period (2002) could cause some bias in the calculation of rates by time since separation. Although this is unlikely to be large, it should be taken into account when interpreting these results. Time since separation suicide rate are incidence rates for the indicated periods post separation. The numerator consists of the number of suicide deaths that occurred whilst the person was within the post separation time frame (for example between one and five years since the person's separation). The denominator is the total time at risk spent by all ex-serving people in the post separation time frame.

## **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.

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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, SMR cannot be used to compare suicide rate between service groups or across time. This is due to the fact that each SMR measure provides a comparison that is specific to the two populations involved. SMRs only compare the study population with the comparison population.

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 rates standardised to a specific standard age structure to facilitate comparison between populations and over time. In this report, they are directly age-standardised rates adjusted using the Australian standard population, that is, the Australian estimated resident population (ERP) as at 30 June 2001.

## **Using confidence intervals to test for statistical significance**

Statistical significance is 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. 95% CIs 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.

## Acronyms

ADF	Australian Defence Force
AIHW	Australian Institute of Health and Welfare
CI	Confidence interval
DSD	Defence Suicide Database
DVA	Department of Veterans' Affairs
NDI	National Death Index
NMD	National Mortality Database
PMKeyS	Personnel Management Key Solution
SMR	Standardised mortality ratio

## 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, 2019 | Australian Bureau of Statistics \(abs.gov.au\)](#)
- ABS quality declaration summary for [Causes of Death, Australia methodology, 2019 | 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](#).

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## Data

The information in this report is based on fact of death information from the National Death Index, cause of death information from the National Mortality Database and the Defence Suicide Database as well as information on members of the three ADF service status groups from Department of Defence payroll systems. 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 Registrars of Births, Deaths and Marriages and the National Coronial Information System (managed by the Victorian Department of Justice) and include cause of death coded by the Australian Bureau of Statistics (ABS). 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.

- **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 and the Defence Suicide Database (DSD) 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 of members serving full time since 1 January 2000. Suspected and confirmed suicides are included in the database only on the advice of the ADF Investigative Service. Cases are confirmed by receipt of a coronial finding of suicide. This database is linked to the PMKeyS and NDI and records with a status of 'confirmed' are used to supplement cause of death information from the NDI for numbers of suicides only.

## References

- ABS (Australian Bureau of Statistics) 2018. Causes of death, Australia, 2017. Explanatory notes. ABS cat. no. 3303.0. Canberra: ABS. Viewed 11 June 2019, <<https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3303.0Explanatory%20Notes12017?OpenDocument>>.
- AIHW (Australian Institute of Health and Welfare) 2018. Canberra: AIHW. Viewed 18 June 2019. [About National Death Index](#).
- AIHW 2018. [Incidence of suicide in serving and ex-serving Australian Defence Force personnel: detailed analysis 2001-2015](#). Cat. No. PHE 218. Canberra; AIHW.
- AIHW 2020. [National suicide monitoring of serving and ex-serving Australian Defence Force personnel: 2020 update](#). Cat. No. PHE 277. Canberra; AIHW.
- Curtin, L. R., & Klein, R. J. (1995). *Direct standardization (age-adjusted death rates)* (No. 6). Hyattsville, MD: US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics.
- Senate Foreign Affairs, Defence and Trade References Committee 2017. *The Constant Battle: Suicide by Veterans*. Canberra: Department of the Senate. Viewed , <[https://www.aph.gov.au/Parliamentary\\_Business/Committees/Senate/Foreign\\_Affairs\\_Defence\\_and\\_Trade/VeteranSuicide/Report](https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/VeteranSuicide/Report)> .



# Appendix: Images of supplementary suicide rate interactive graphs

Please note :The graphs below are an image of an interactive graphs available in the online version of this report.

**Figure 2: Rate of suicide by service status and sex, 2002-2004 to 2017-2019**

Select which data you wish to view below and hover over a data point for detailed information.

Select service category

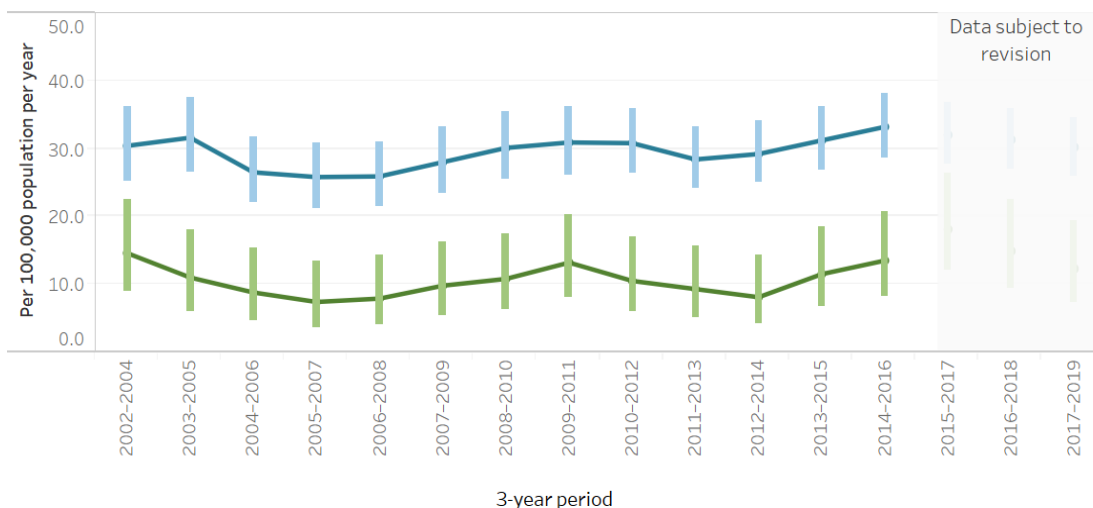
- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

Compare to

- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

**Figure 2: Rate of suicide by service status and sex, 2002-2004 to 2017-2019**

Select which data you wish to view below and hover over a data point for detailed information.

**Select service category**

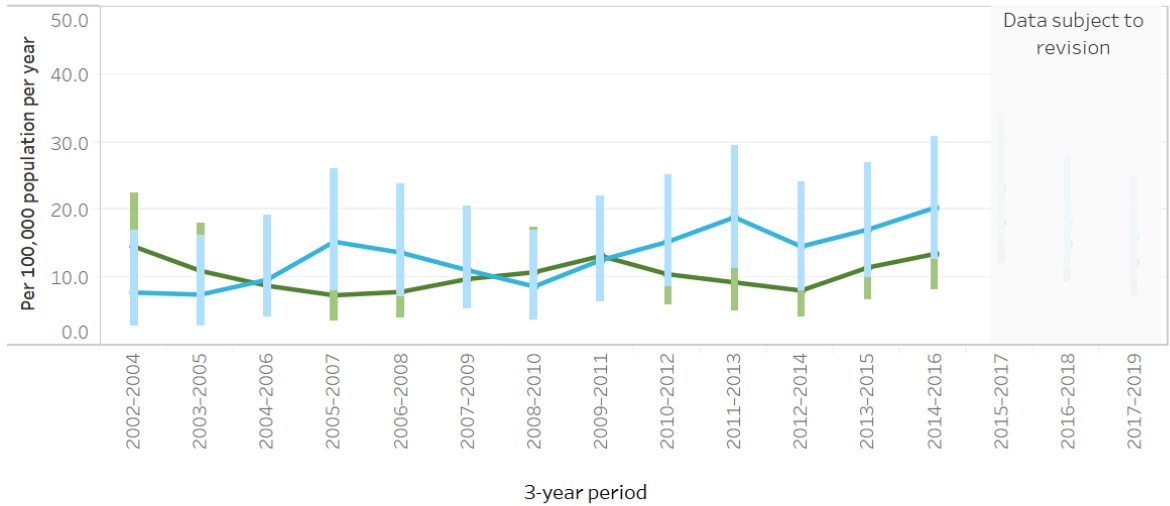
- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

**Compare to**

- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

**Show confidence interval?**

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

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Select which data you wish to view below and hover over a data point for detailed information.

Select service category

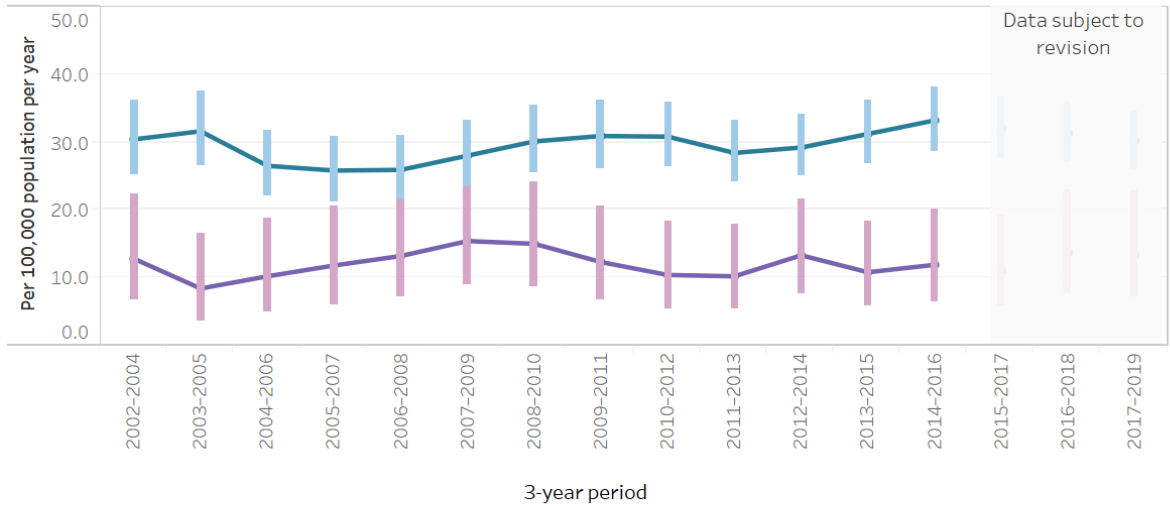
- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

Compare to

- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
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Select service category

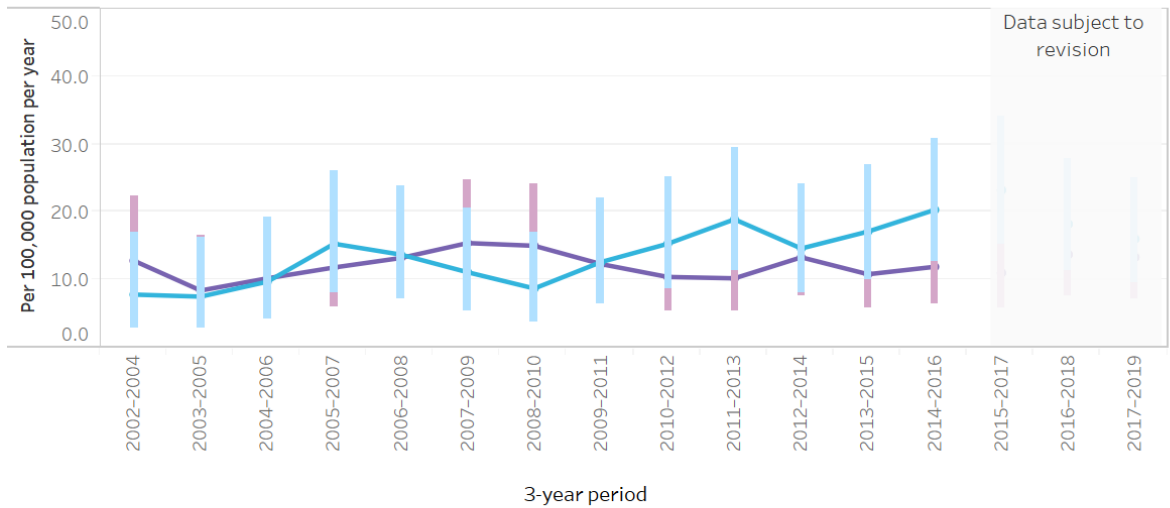
- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

Compare to

- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

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Select service category

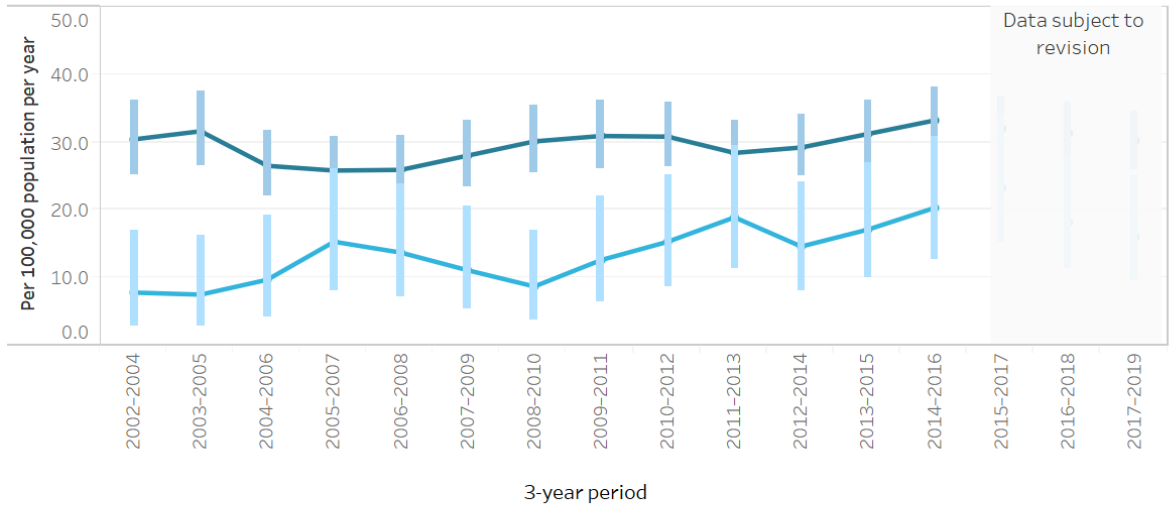
- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

Compare to

- Permanent males
- Reserve males
- Ex-serving males
- Ex-serving females

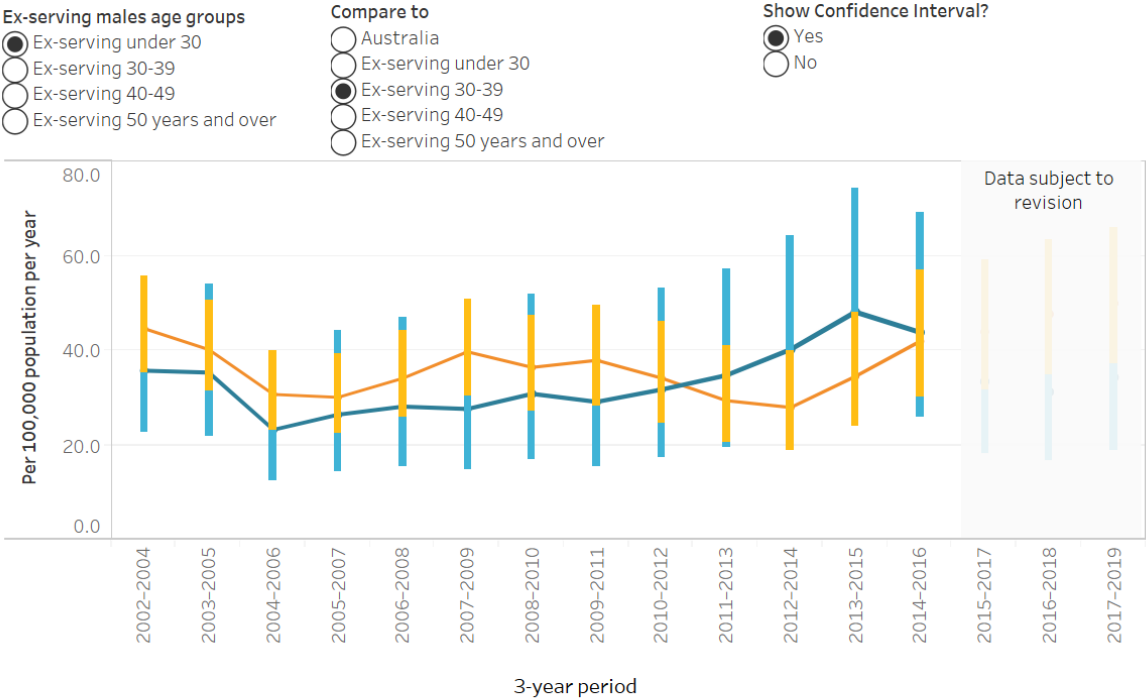
Show confidence interval?

- Yes
- No



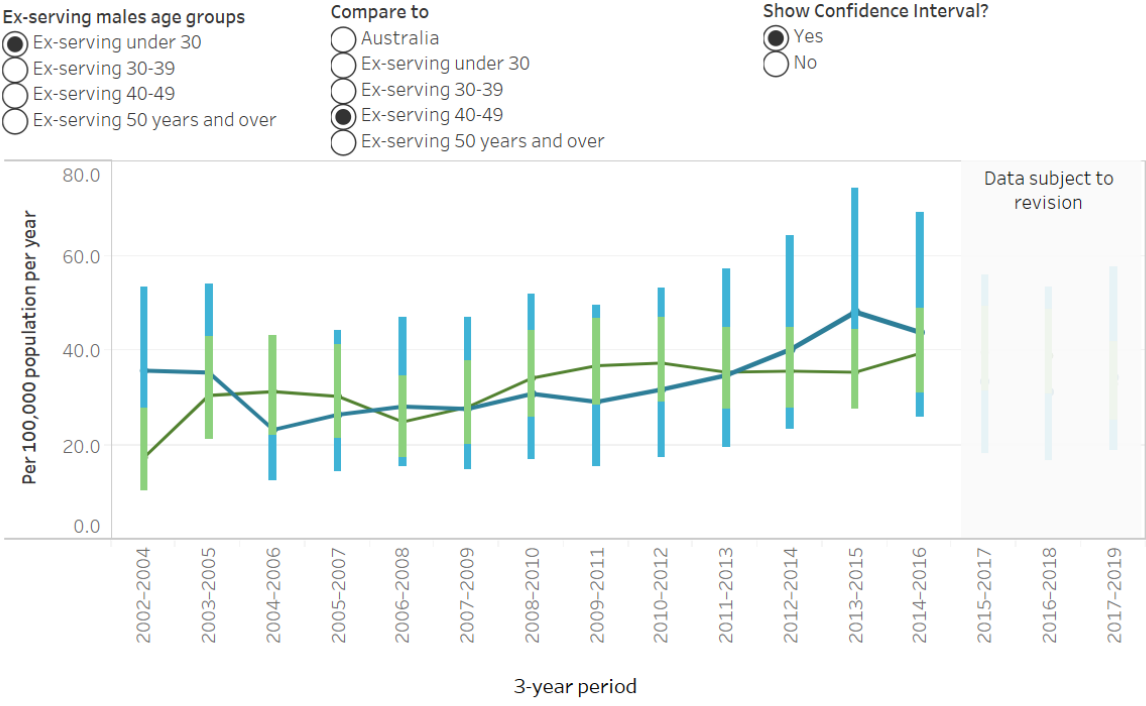
Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

**Figure 5: Rate of suicide, ex-serving and Australian males by age, 2002-2004 to 2017-2019** Select which data you wish to view below and hover over a data point for detailed information.



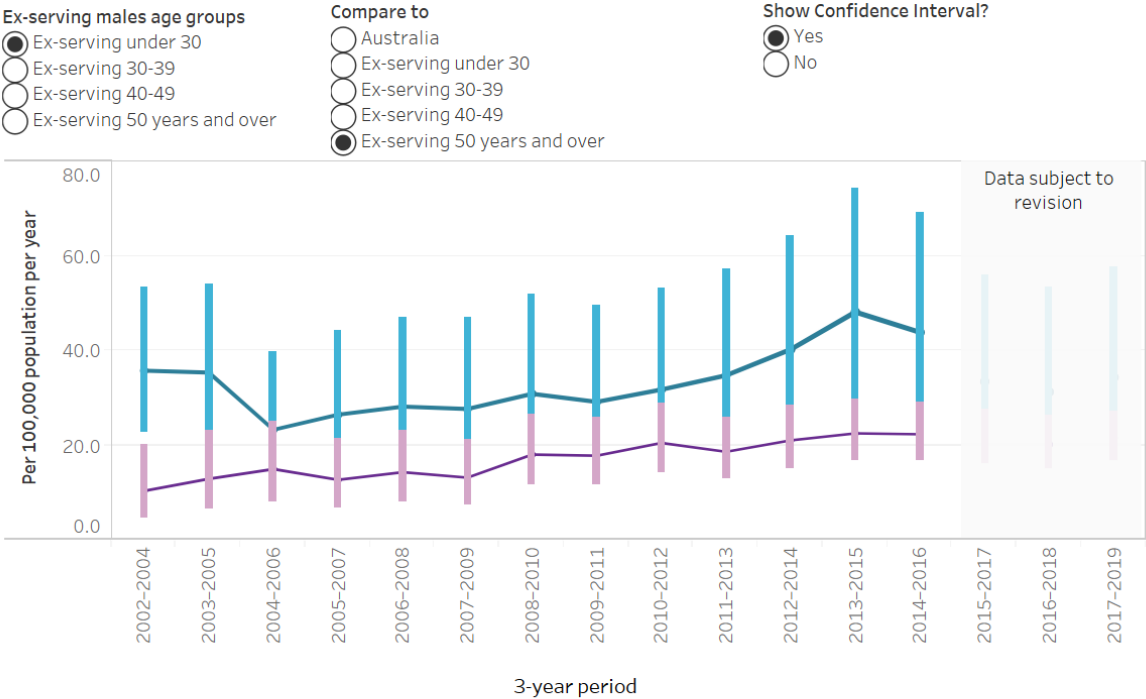
Source: AIHW analysis of linked Defence historical personnel data- PMKeyS-NDI data 1985-2019.  
<http://www.aihw.gov.au>

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Source: AIHW analysis of linked Defence historical personnel data- PMKeyS-NDI data 1985-2019.  
<http://www.aihw.gov.au>

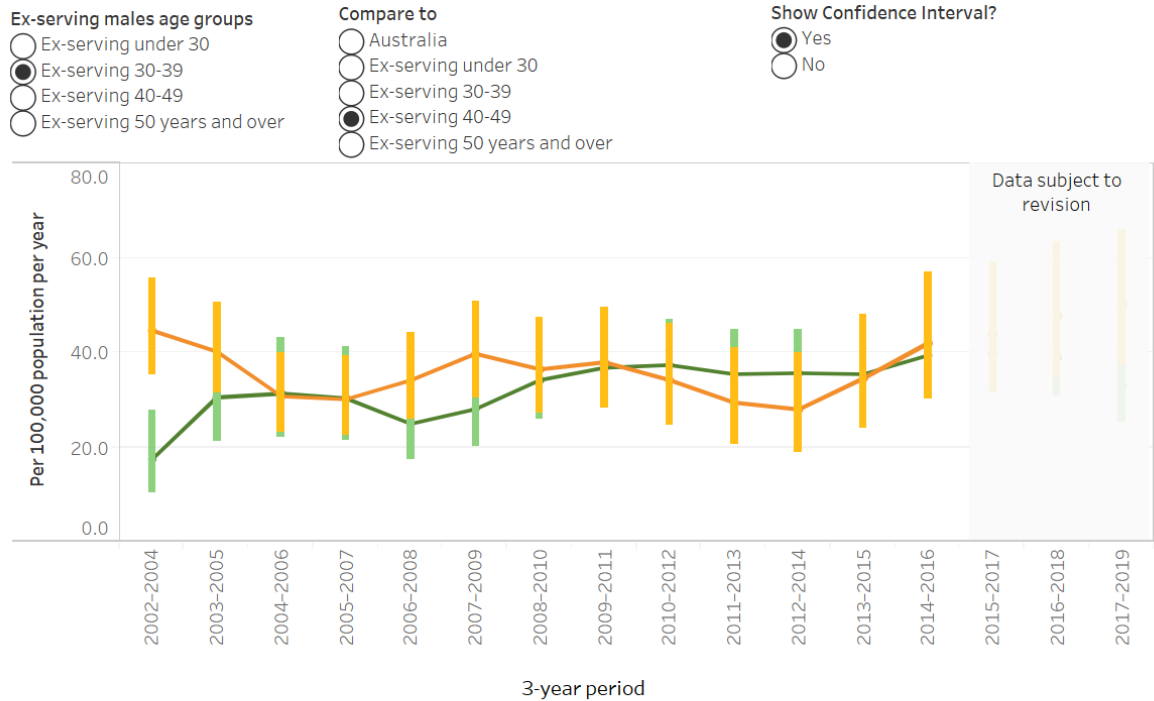
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Source: AIHW analysis of linked Defence historical personnel data- PMKeyS-NDI data 1985-2019.  
<http://www.aihw.gov.au>

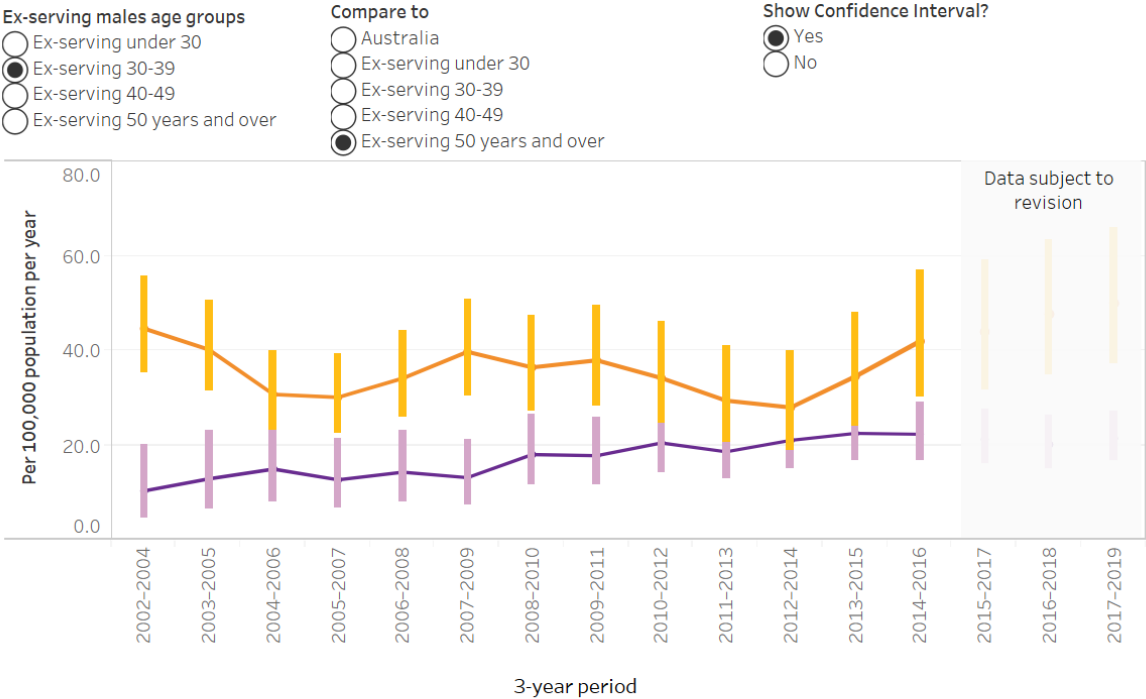


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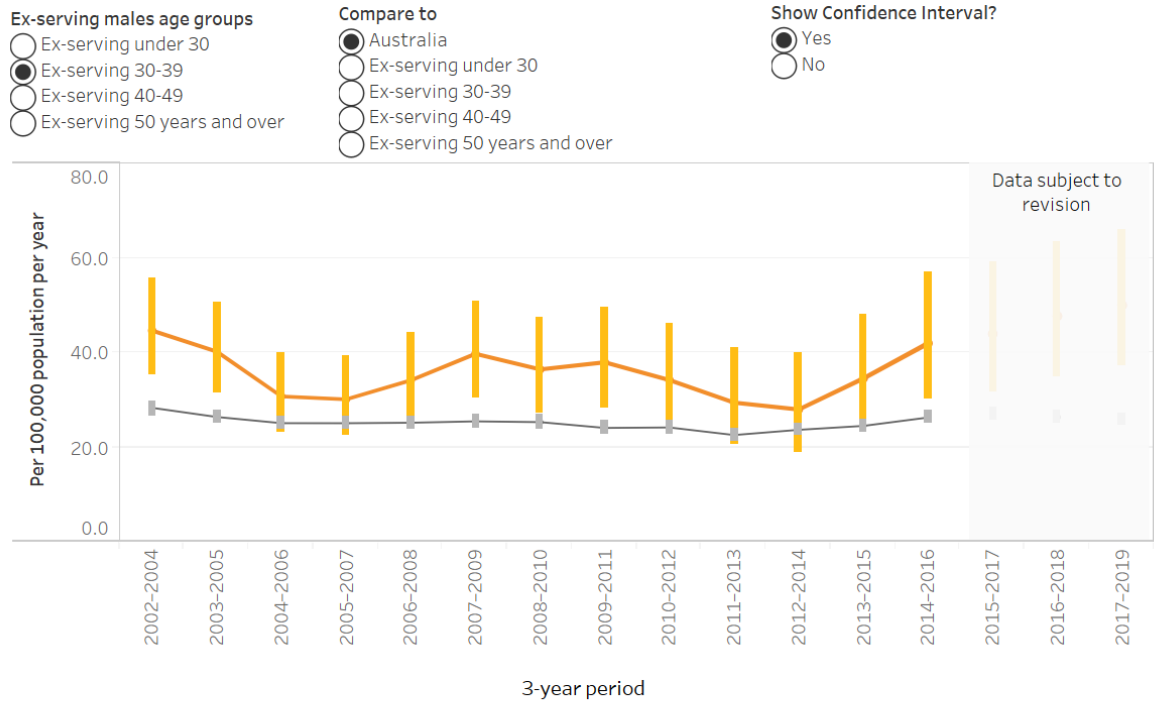
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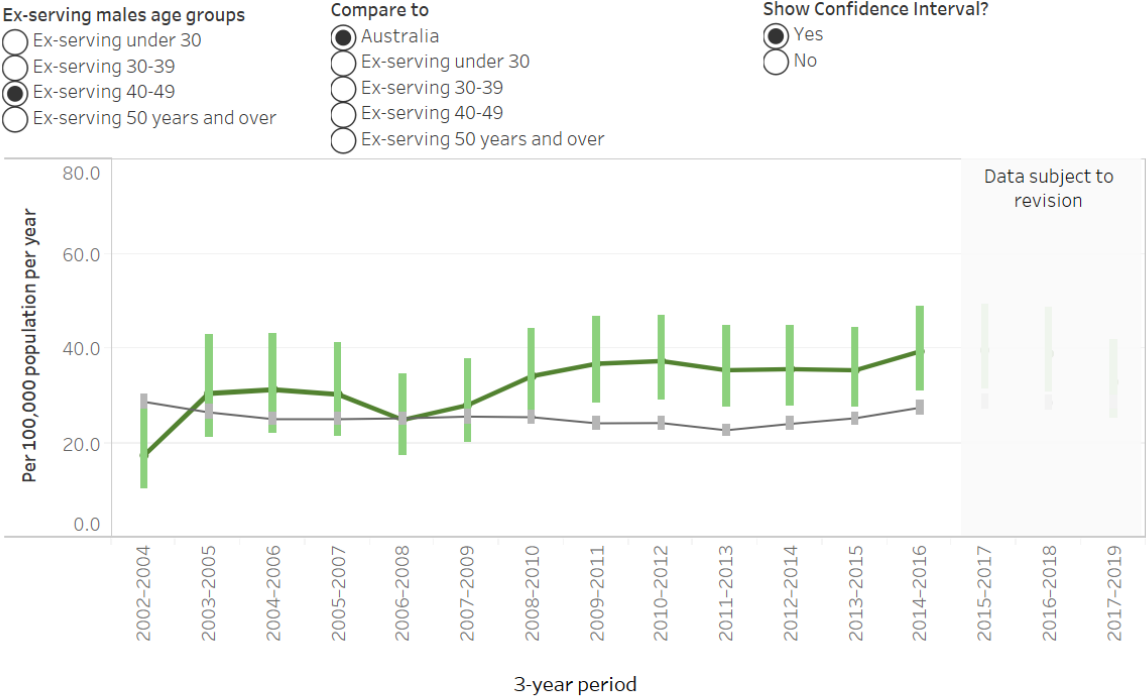
Source: AIHW analysis of linked Defence historical personnel data- PMKeyS-NDI data 1985-2019.  
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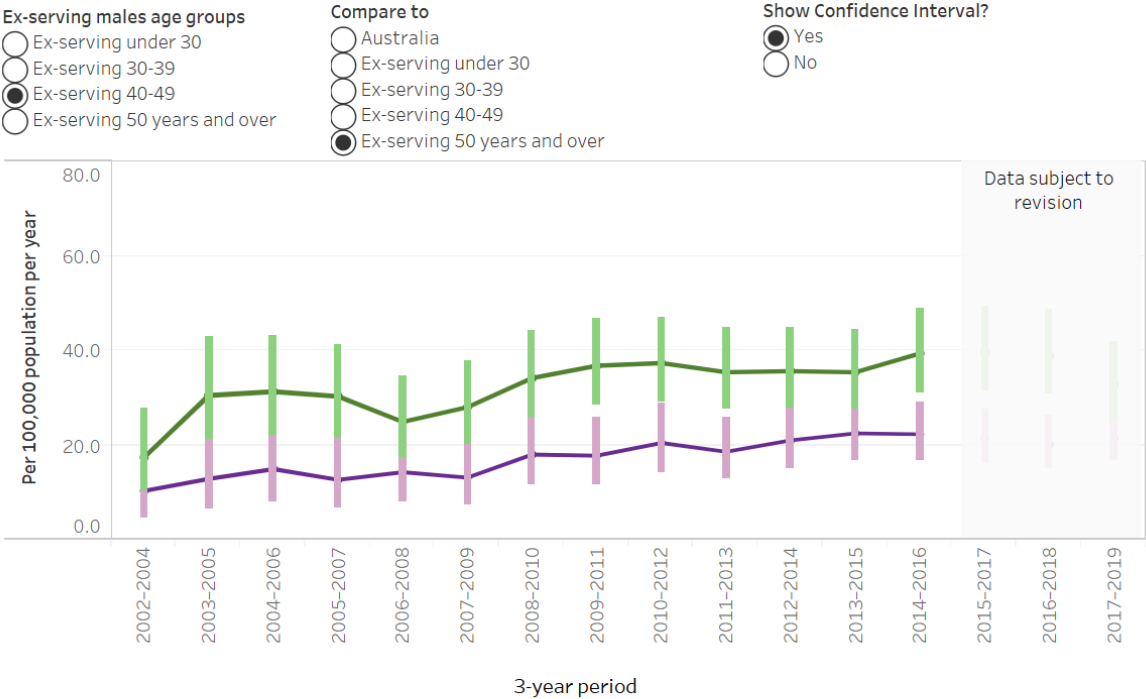
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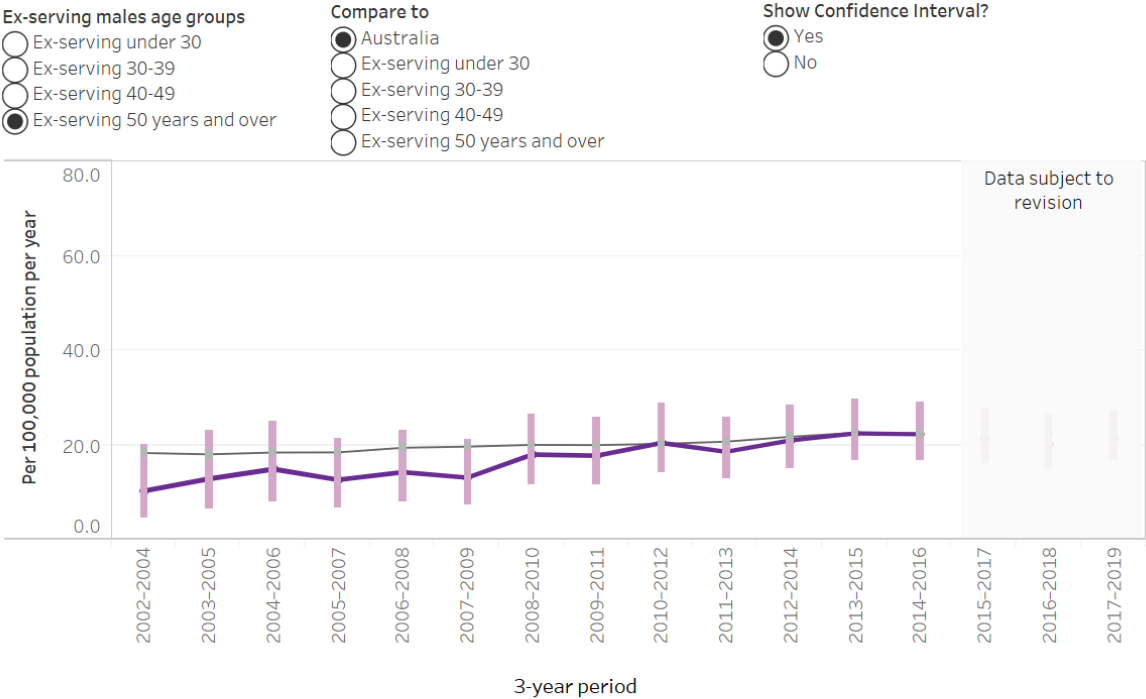
Source: AIHW analysis of linked Defence historical personnel data- PMKeyS-NDI data 1985-2019.  
<http://www.aihw.gov.au>

**Figure 5: Rate of suicide, ex-serving and Australian males by age, 2002-2004 to 2017-2019** Select which data you wish to view below and hover over a data point for detailed information.



Source: AIHW analysis of linked Defence historical personnel data- PMKeyS-NDI data 1985-2019.  
<http://www.aihw.gov.au>

**Figure 5: Rate of suicide, ex-serving and Australian males by age, 2002-2004 to 2017-2019** Select which data you wish to view below and hover over a data point for detailed information.



Source: AIHW analysis of linked Defence historical personnel data- PMKeyS-NDI data 1985-2019.  
<http://www.aihw.gov.au>

**Figure 8: Rate of suicide for ex-serving males by Service, 2002-2004 to 2017-2019.**

Select which data you wish to view below and hover over a data point for detailed information.

Select service category

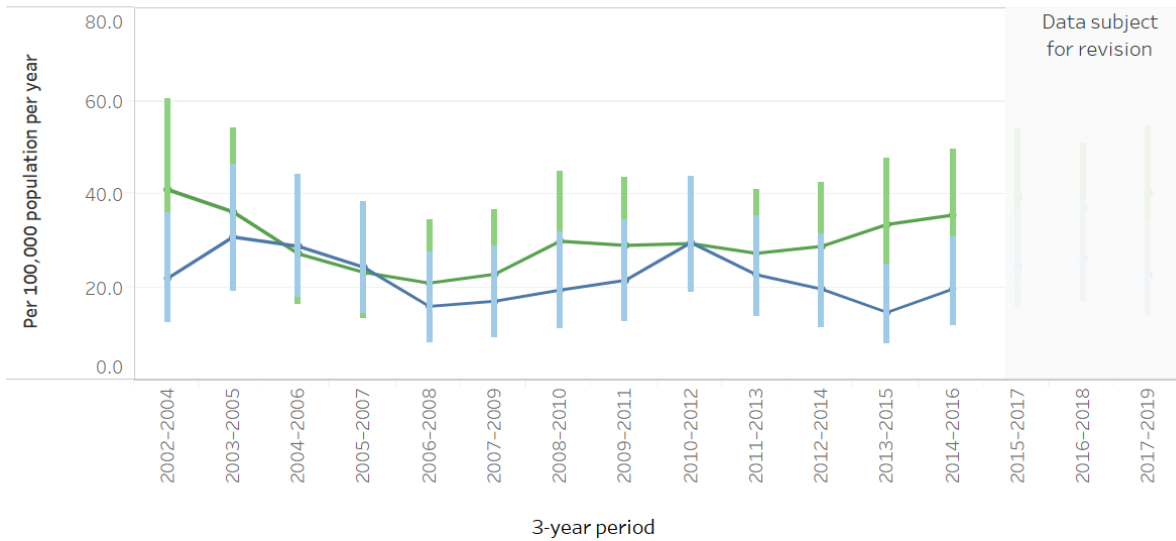
- Navy males
- Army males
- Air Force males

Compare to

- Navy males
- Army males
- Air Force males

Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

**Figure 8: Rate of suicide for ex-serving males by Service, 2002-2004 to 2017-2019.**

Select which data you wish to view below and hover over a data point for detailed information.

Select service category

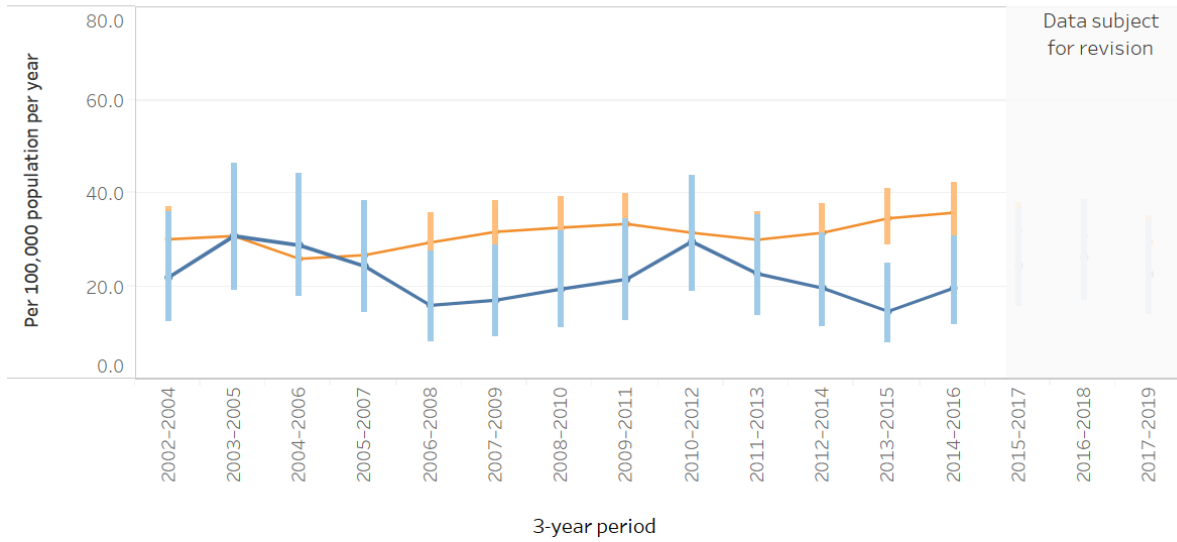
- Navy males
- Army males
- Air Force males

Compare to

- Navy males
- Army males
- Air Force males

Show confidence interval?

- Yes
- No



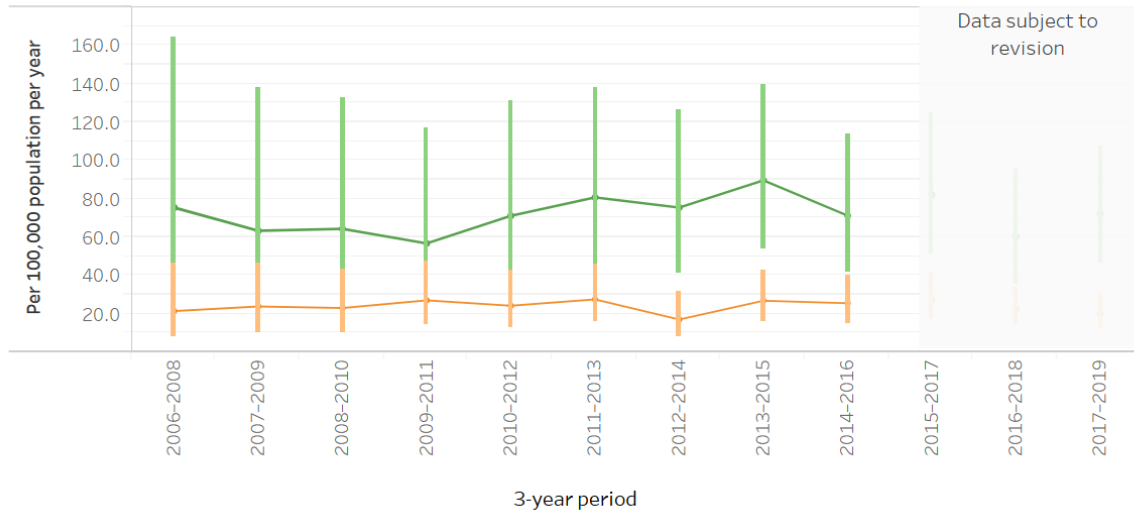
Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>



**Figure 11: Rate of suicide for ex-serving males by reason for separation, 2006-2008 to 2017-2019**

Select which data you wish to view below and hover over a data point for detailed information.

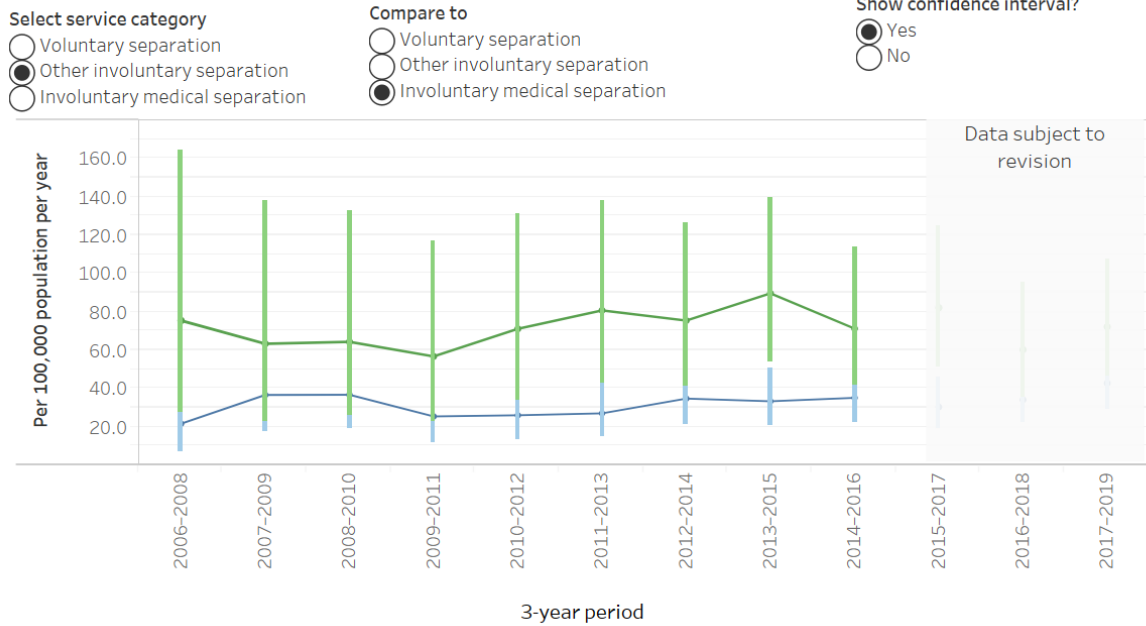
- Select service category**
- Voluntary separation
  - Other involuntary separation
  - Involuntary medical separation
- Compare to**
- Voluntary separation
  - Other involuntary separation
  - Involuntary medical separation
- Show confidence interval?**
- Yes
  - No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

**Figure 11: Rate of suicide for ex-serving males by reason for separation, 2006-2008 to 2017-2019**

Select which data you wish to view below and hover over a data point for detailed information.



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

**Figure 14: Rate of suicide for ex-serving males by length of service, 2002-2004 to 2017-2019**

Select which data you wish to view below and hover over a data point for detailed information.

Select service category

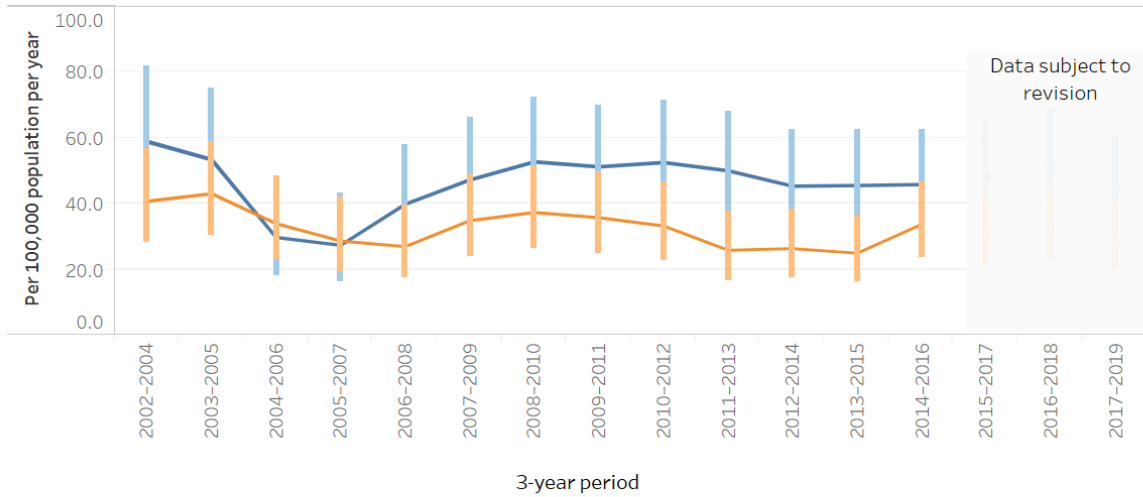
- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Compare to

- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

**Figure 14: Rate of suicide for ex-serving males by length of service, 2002-2004 to 2017-2019**

Select which data you wish to view below and hover over a data point for detailed information.

Select service category

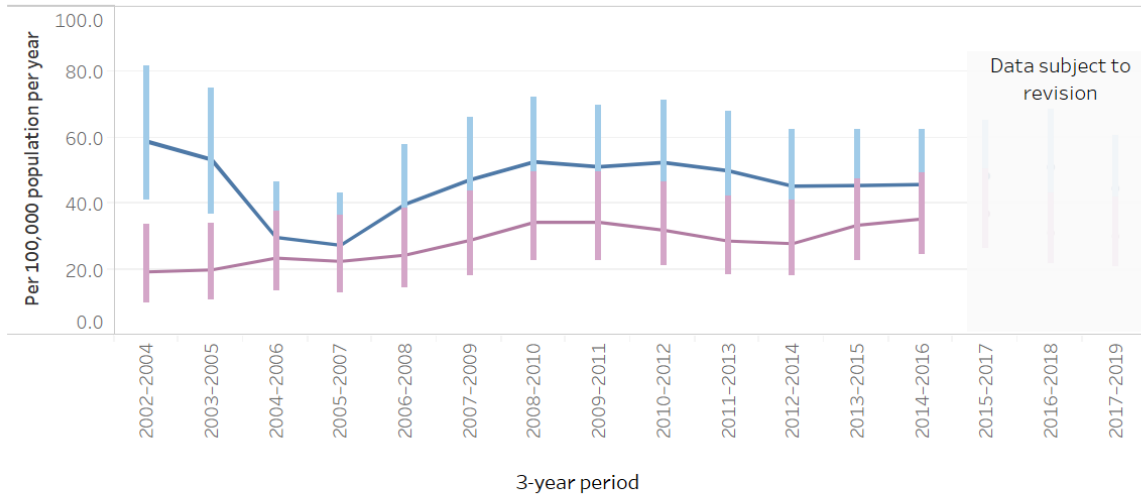
- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Compare to

- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

**Figure 14: Rate of suicide for ex-serving males by length of service, 2002-2004 to 2017-2019**

Select which data you wish to view below and hover over a data point for detailed information.

Select service category

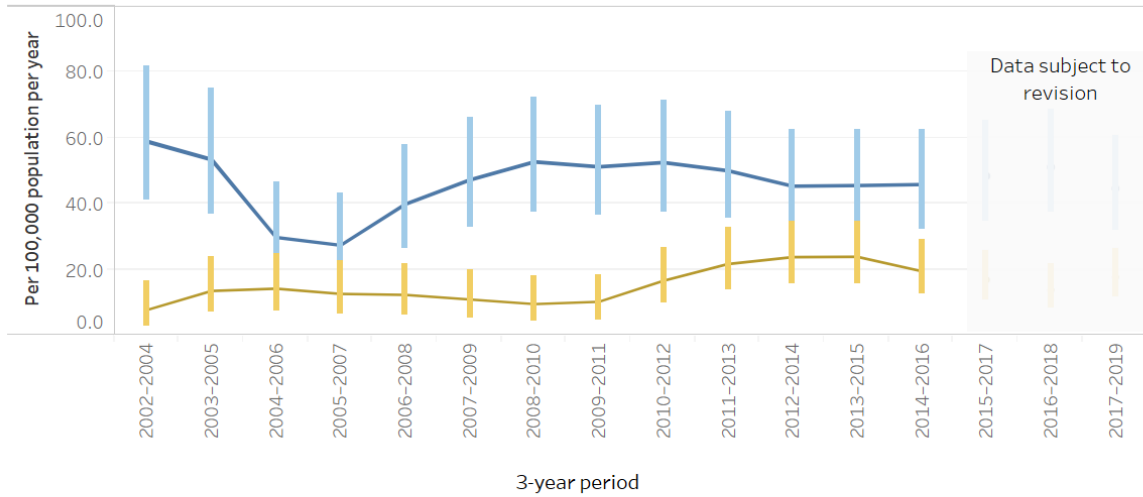
- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Compare to

- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

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Select service category

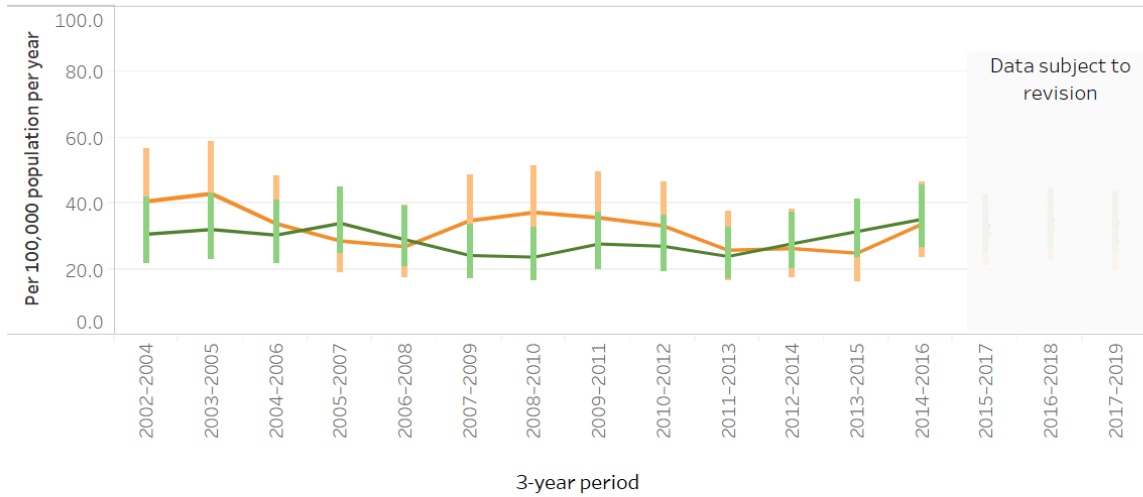
- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Compare to

- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
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Select service category

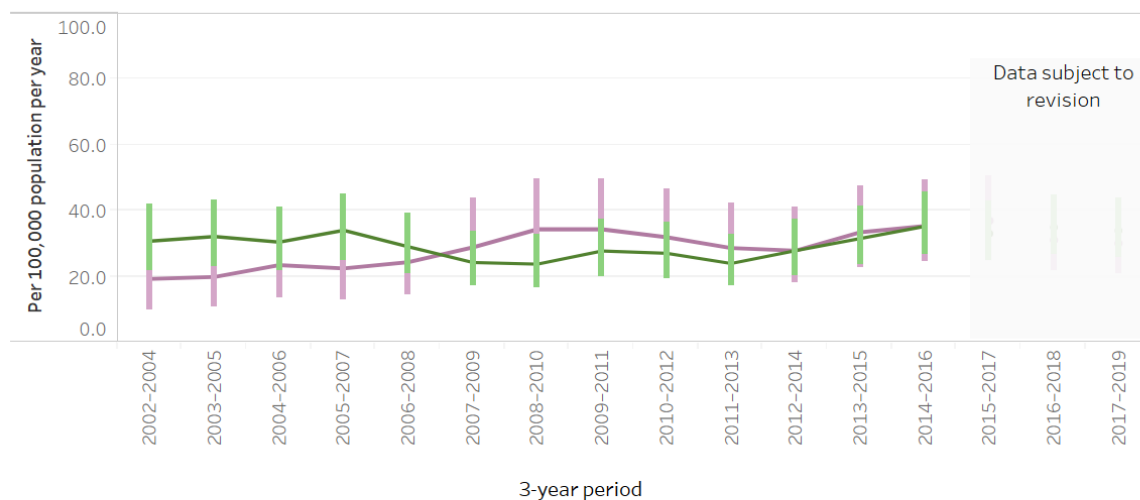
- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Compare to

- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
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Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

**Figure 14: Rate of suicide for ex-serving males by length of service, 2002-2004 to 2017-2019**

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Select service category

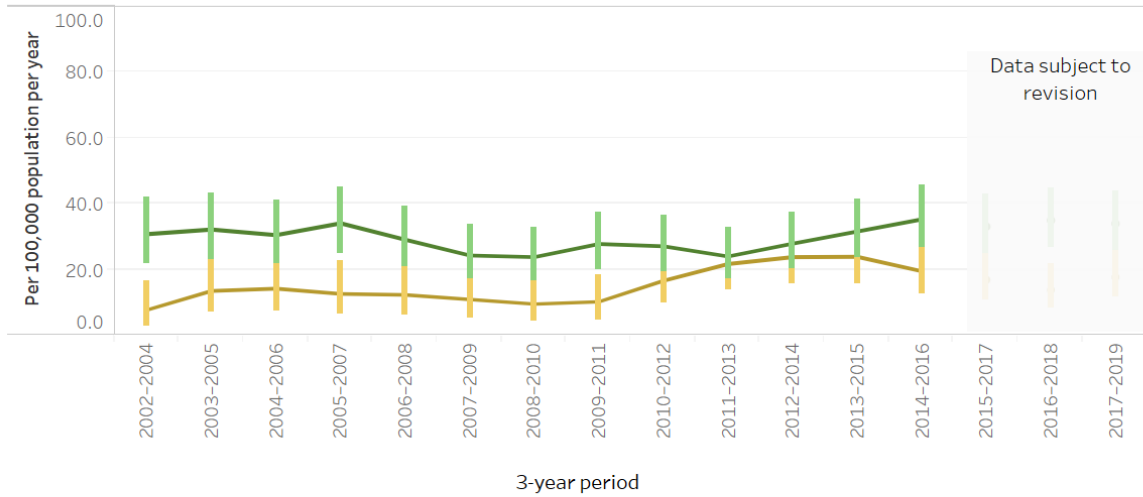
- < 1 year
- 1 - < 5 years
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Show confidence interval?

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- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>



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Select service category

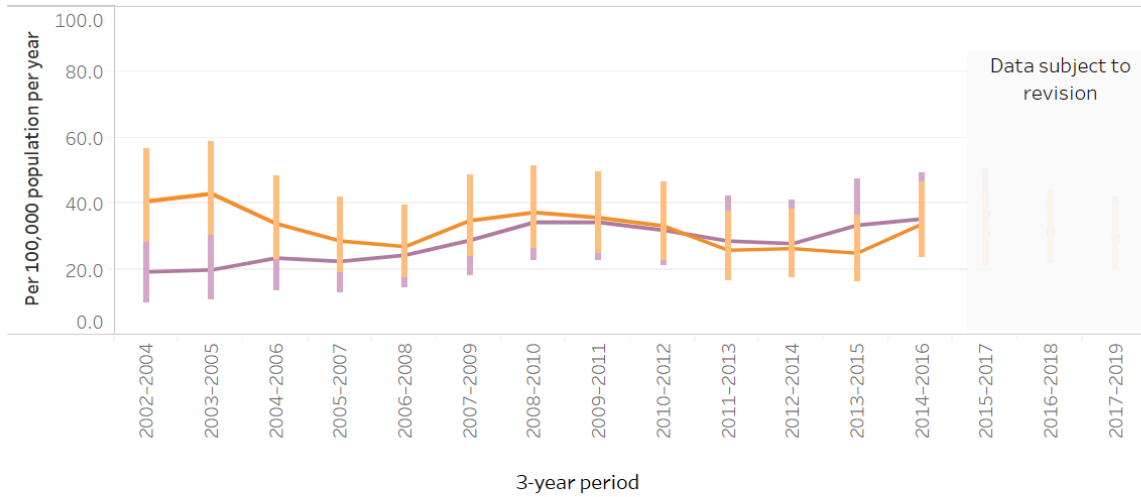
- < 1 year
- 1 - < 5 years
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Compare to

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- 5 - < 10 years
- 10 - < 20 years
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Show confidence interval?

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- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
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Select service category

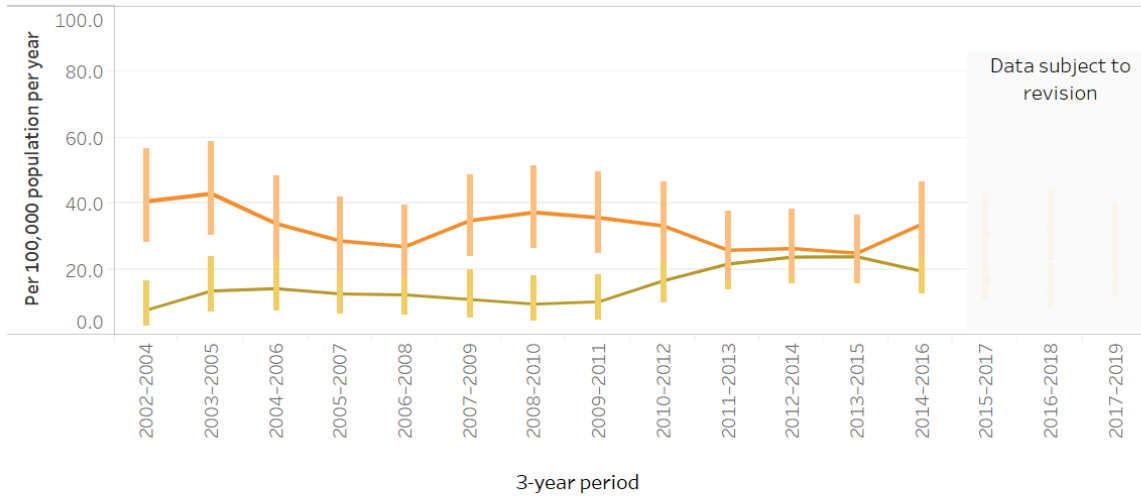
- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Compare to

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Show confidence interval?

- Yes
- No



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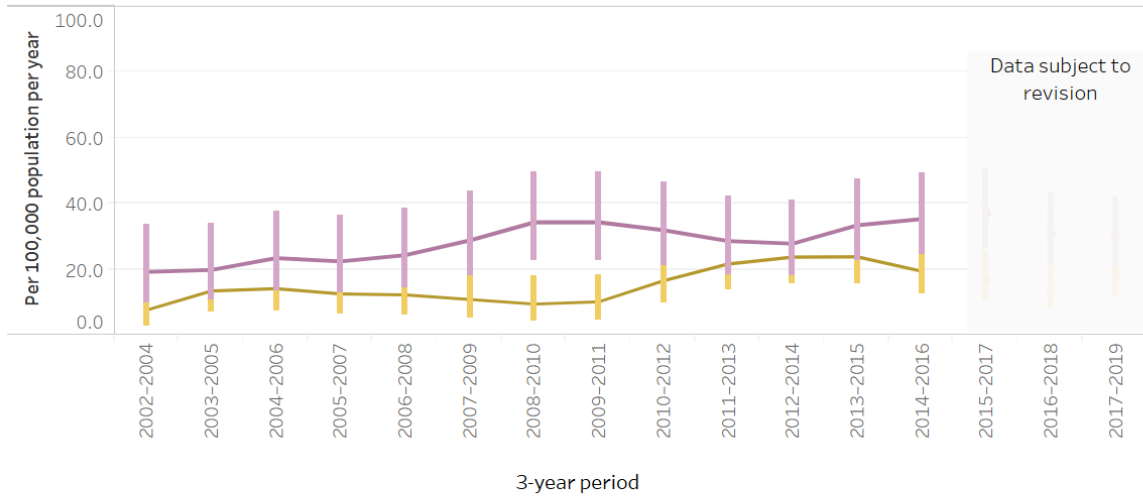
- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Compare to

- < 1 year
- 1 - < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Show confidence interval?

- Yes
- No



Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019  
<http://www.aihw.gov.au>

**Figure 16: Rate of suicide for ex-serving males by time since separation, 2002-20..**

Select which data you wish to view below and hover over a data point for detailed information.

Select service category

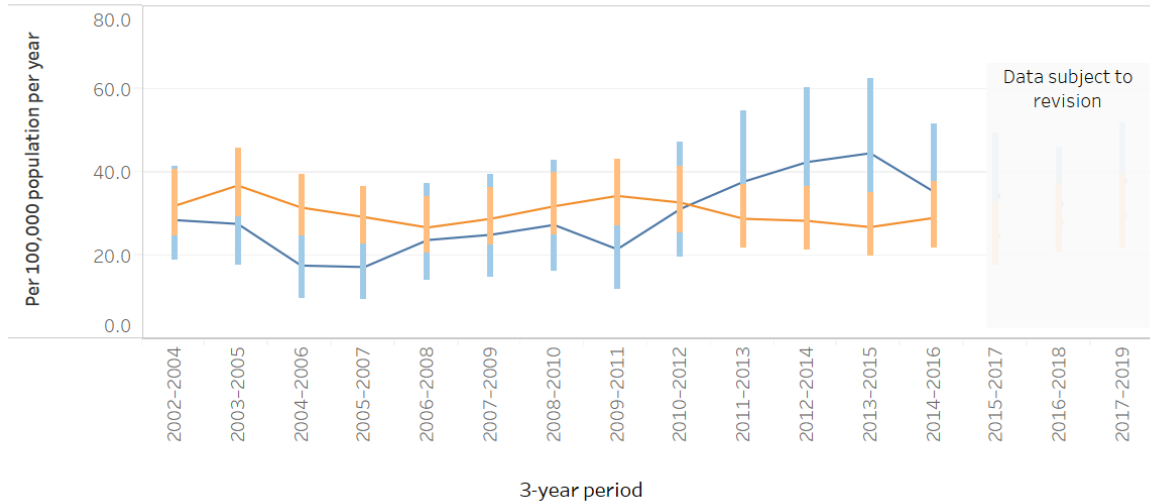
- < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Compare to

- < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Show confidence interval?

- Yes
- No



Due to the scope of the study population, suicide rates for time since separation 20 or more years are from 2005-2019.

Source: AIHW analysis of linked Defence historical personnel data-PMKeyS-NDI data 1985-2019

<http://www.aihw.gov.au>

**Figure 16: Rate of suicide for ex-serving males by time since separation, 2002-20..**

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Select service category

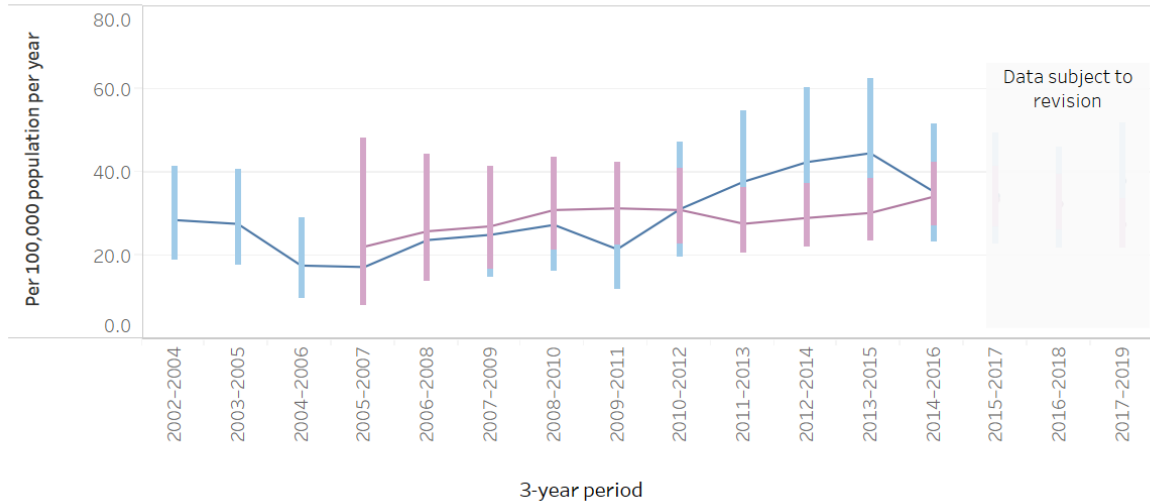
- < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Compare to

- < 5 years
- 5 - < 10 years
- 10 - < 20 years
- 20 or more years

Show confidence interval?

- Yes
- No



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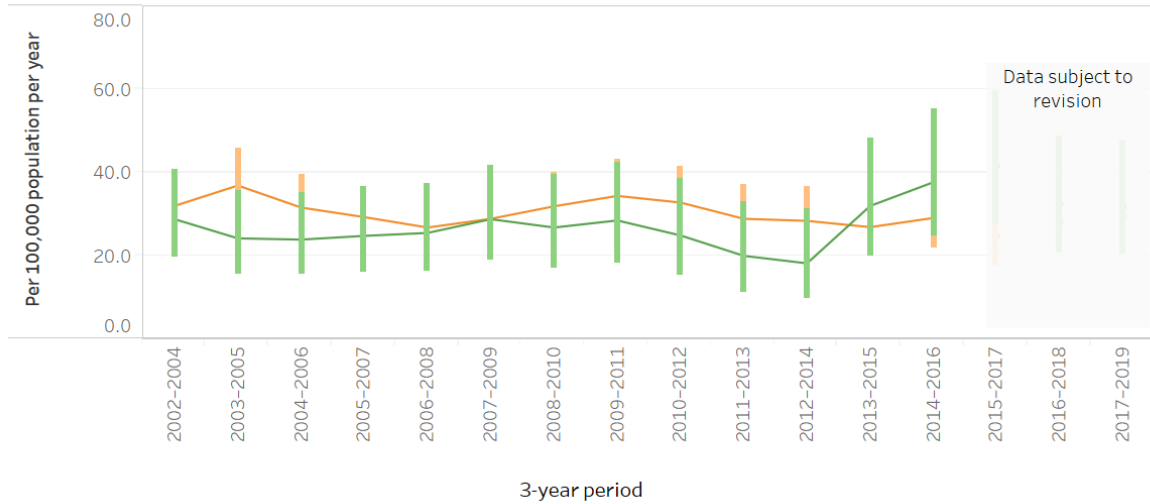
- < 5 years
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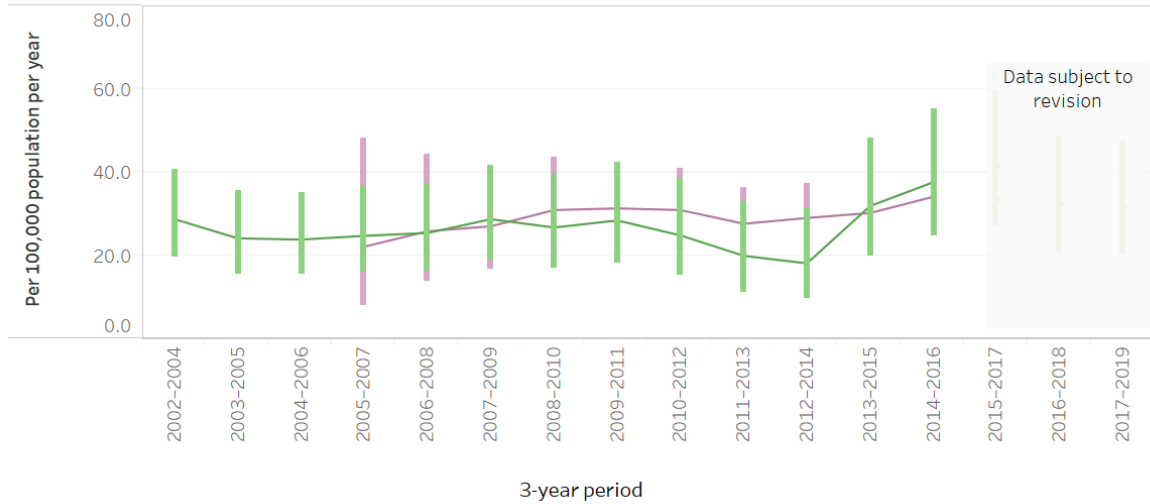
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- 5 - < 10 years
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- 20 or more years

Show confidence interval?

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- No



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- < 5 years
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<http://www.aihw.gov.au>





This report is the fourth annual update into suicides among permanent, reserve and ex-serving Australian Defence Force (ADF) members and the first to include the population of ADF members who served in the ADF between 1985 and 2019 by using data from historical ADF personnel systems. Permanent and reserve male ADF members die by suicide at about half the rate of Australians of similar age and gender, while, ex-serving male members have a higher rate than Australian males.

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Stronger evidence,  
better decisions,  
improved health and welfare

