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Suicide in Australia

Trends and analysis: 1964 to 2018

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Suicide in Australia

Trends and analysis

1964 to 2018

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Contents

Summary

Suicide rates for males in Australia, adjusted for age, fluctuated around 20 deaths per 100,000 population per year in the period 1964 to 2018. Rates for females decreased from 13 deaths per 100,000 population in 1965 (the high point of a peak in poisoning) to below 7 in 1979, then fluctuated around 5 deaths per 100,000 population until the end of the period.

In 1964, suicide deaths were much less numerous than road deaths. Road deaths peaked in 1970 and have declined greatly since then, dropping below suicide as a cause of death in 1991. In 1964, the road death rate was nearly twice the suicide rate; by 2018, the road death rate was less than half the suicide rate.

Suicide rates at ages 10 years and older were examined for the Australian men and women born in each 5-year period from 1954 to 1958 to 2004 to 2008. In each cohort, rates rose from a low level at age 10–14 to a much higher level in early adulthood.

For males, the suicide rate by 20–24 was about 20 deaths per 100,000 cohort members in the earliest cohort considered (born 1954–58) and for the most recently-born cohorts for which this rate is available (born 1989–98). Male cohorts born between those periods reached higher suicide rates at 20–24, over 30 deaths per 100,000. Differences in rates between the cohorts diminished by middle age. For example, rates at age 40–44 ranged from 26 to 29 deaths per 100,000 in the 4 cohorts for which data are available at that age.

Female cohorts born 1954–58 to 1989–93 all followed a similar pattern to early adulthood, rates rising to 5 to 7 suicide deaths per 100,000 by age 20–24. There has been more variation between female cohorts at older ages, rates levelling off in some and continuing to rise in others. Suicide rates in recently-born female cohorts have risen the fastest of any during teen years. Those born 1994–98 and 1999–2003 reached 6 suicide deaths per 100,000 by age 15–19, considerably higher than earlier female cohorts at the same age.

Mechanisms of suicide have changed greatly in the period considered. For males, shooting by firearms led until 1988, when it was surpassed by hanging. For females, poisoning led until the mid-1990s, when hanging became most frequent. By 2018, hanging accounted for about two-thirds of male suicide deaths and half of female suicide deaths.

Male rates of suicide by firearms fluctuated between 6 to 7 deaths per 100,000 population until the late 1980s before decreasing to just over 1 by 2018. Female rates were much lower than male throughout. Suicide by shooting has declined greatly in the earlier-born cohorts and has never been common in the later-born cohorts. Suicide by gas, mostly motor vehicle exhaust gas, peaked in the 1990s. It has declined greatly since then, dropping in the cohorts in which it was once common and remaining low in later-born cohorts.

Suicide rates were generally much higher for males than females, overall and for the mechanisms just mentioned. However, female rates of suicide due to poisons (other than gas) have been similar to male rates throughout the period from 1964 to 2018. This period started during an epidemic of suicide poisoning mortality largely involving barbiturates. Rates of poisoning suicide fell steeply, then gradually, to a low point in the 2000s. Rates from this cause were trending upwards for all cohorts, male and female, at the end of the period.

Most suicides due to poisoning (other than gas) involve pharmaceutical substances. Between 1997 and 2018, the most common types of pharmaceuticals used by males were benzodiazepines (19%), opioids (18%) and antidepressants (18%). Equivalent values for females were 18%, 15% and 21%. Opioids accounted for 31% of suicides by this mechanism in this period, while antidepressants accounted for a further 19%.

1 Introduction

Suicide is a significant public health problem in Australia. Since the mid-1980s, over 2,000 Australians have died by suicide each year, with counts exceeding 3,000 in 2017 and 2018 (ABS 2019).

This report provides a statistical picture of suicide in Australia based on administrative data. It describes long-term trends in suicide mortality, since the mid-1960s, including analyses in terms of age at death, period of death and period of birth. The main themes of analysis are age and sex, changes over time and mechanisms of self-harm.

The way in which self-harm is caused (for example, by poisoning, cutting or shooting) is often referred to as the 'mechanism' or 'means' of self-harm, with 'mechanism' being the term used in this report. Mechanisms differ greatly between subgroups of the population and have changed considerably over time, sometimes rapidly. Some changes in occurrence coincided with changes in the availability of a particular mechanism. For example, a significant increase in suicide deaths involving poisoning by drugs, peaking in the mid-1960s, has been attributed largely to changes in the availability of barbiturate sedatives (Oliver & Hetzel 1972; Whitlock 1975). The replacement, around 1970, of toxic 'town gas' by less toxic gases for domestic purposes was accompanied by much reduced rates of suicide by this mechanism in Australia (Burvill 1989). Similar reductions occurred in the United Kingdom and Japan (Kreitman 1976; Lester & Abe 1989).

Understanding such changes is important for two reasons. First, mechanisms of suicide differ greatly in lethality, as well as in frequency of use (Elnour & Harrison 2008; Spittal et al. 2012; Conner et al. 2019). The trend in overall suicide rates is a matter of public and policy interest, and trends are less likely to be misinterpreted if the influence of changes in mechanisms is understood. Second, restriction of access to means is one of the approaches advocated for suicide control (McPhedran & Baker 2012, Kim et al. 2019).

Most statistical reports on suicide present data in terms of period (for example, the year in which a death occurred and age at death). Another perspective, also useful when reporting on suicide and intentional self-harm, is to present the events in terms of age at occurrence and period of birth (for example, Phillips et al. 2010; Snowdon & Hunt 2002; Phillips 2014; Park 2016). All the individuals born in a particular period (for example, a year or a decade) can be referred to as a birth cohort. While the same data are used to present data in terms of periods or cohorts, the different arrangement sometimes provides additional insights. This report builds upon a similar approach used in a previous report which analysed suicide deaths in Australia over the period from 1921 to 2010 (AIHW: Harrison & Henley 2014). Selected aspects of the cohort analysis are included in the chapters on suicide trends, while additional results are presented in Appendices B and C.

Many factors have been reported to be associated with risk of suicide and intentional self-harm (DeLeo et al. 2002; McLean et al. 2008, Turecki et al. 2019). Deaths data and population data in Australia (as in most other countries) do not generally provide data on many of these and so characteristics such as mental illness and substance abuse are not reported here.

Data quality and reliability

Concerns are often expressed that statistics on suicide may be affected by errors, perhaps more than most other causes, due to difficulty in ascertaining the true motivation of actions and to the effects of social stigma. These issues have been considered in previous AIHW reports (Harrison et al. 2009; Henley & Harrison 2009; AIHW: Harrison & Henley 2015) and elsewhere (e.g. Claassen et al. 2010). An extensive review of suicide by the Senate Community Affairs Reference Committee made recommendations on data definition, collection and reporting (Senate Community Affairs Reference Committee 2010).

Ability to form an intention to inflict self-harm and to understand the implications of doing so require a degree of maturity that is absent in infancy and early childhood. The age at which self-inflicted acts can be interpreted as intentional self-harm is not well-defined and is the subject of debate. For these reasons, few deaths or hospital episodes of children younger than 10 are assigned cause codes for intentional self-harm, and 10–14 is the youngest age-group for which values are presented in this report.

Terms, concepts and reporting periods

Some terms and concepts are introduced here to facilitate understanding of the data presented in this report. The report provides statistics based on analysis of the cases included in the routine national deaths data collection, and on the records in the national collection of data on cases treated as hospital-admitted patients, where the 'external cause' of injury was recorded as being intentional self-harm, including suicide and attempted suicide (see Appendix A for a full description of inclusion criteria for the report).

In this report, deaths that were attributed to *Intentional self-harm* (ICD-10) and *Suicide and self-inflicted injury* (a term used in earlier revisions of the ICD) are referred to as *suicide*.

Chapter 2 provides data on long-term trends in suicide overall, while chapters 3 to 7 provide similar information on each of the 4 main mechanisms of suicide in Australia and, more briefly, for other mechanisms.

Trends in suicide are presented in terms of calendar years. Calendar year of death provides more reliable information on trends in occurrence than year of registration, and has been used where available (that is, for deaths in 1964 and later years). Year of registration is the only date available for deaths before then.

The latest deaths data available at the time of preparation were in the preliminary release of data on deaths registered by the end of 2018. Some deaths that occurred in 2018, and a few that occurred before that, will not have been registered by the end of 2018. Also, the available data files for deaths registered in in 2016, 2017 and 2018 are not the final version. Information from earlier years on late registrations and on changes in numbers of suicide deaths from the preliminary to the final release was used to avoid presenting misleadingly low case counts and rates for the most recent data points, particularly calendar year 2018. (See Appendix A for further information.)

Values that underlie the figures in the report are provided in an accompanying spreadsheet.

2 Trends in suicide by all means

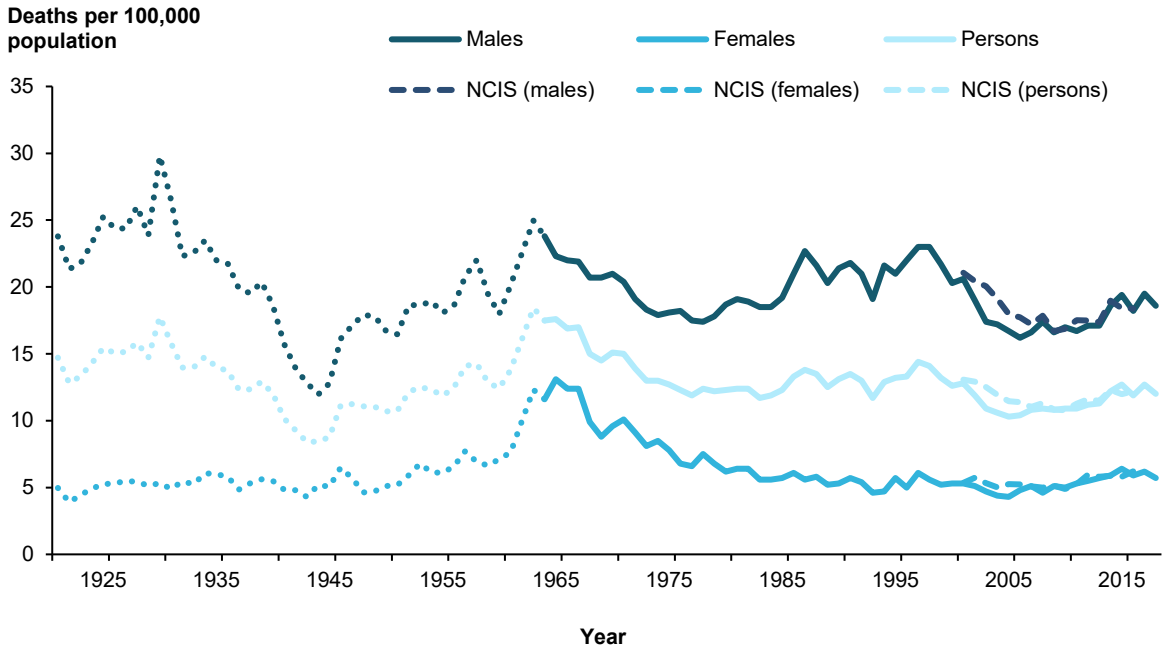
Overall suicide death rates for males, adjusted for age, fluctuated above and below a rate of 20 deaths per 100,000 population per year in the period 1921 to 2018 (Figure 2.1). Rates for females were about 5 deaths per 100,000 population per year throughout most of this period, with a peak to twice this rate in the 1960s. The largest fluctuations are discussed briefly here.

Suicide rates for males were relatively high in the late 1920s, and highest in 1930. It has been noted that this coincides with the Great Depression (for example, Simon-Davies, 2011). Several years of financial and industrial turmoil and rising unemployment in Australia preceded the share market crash of 1929, after which unemployment rose further, peaking at about 20% in 1932 and remaining above 10% until late in the decade (Jonson & Stevens, 1983).

The apparent dip in male suicide rates in the early 1940s (the period of World War 2) is at least partly a statistical artefact due to the fact that deaths from all causes of Australian service personnel while overseas were omitted from Australian deaths data, while population estimates were not adjusted to allow for the absence of these personnel.

The peak for both males and females in the 1960s reflects a large rise in fatal poisoning by barbiturates (see Chapter 5).

Figure 2.1: Suicide rates, by sex, Australia, 1921 to 2018



Notes:

1. Rates for 1921 to 1963 are by year of registration (dotted line) and rates for 1964 to 2018 are by year of death (solid line).
2. Rates are age standardised.
3. Data underpinning this figure are available in the supplementary table spreadsheet Table S2.1.
4. Deaths from all causes of Australian service personnel while overseas during World War 2 were not included in Australian deaths data. However, population estimates for the period do not allow for their absence, so the charted rates are underestimates, especially for males.

Source: AIHW National Mortality Database.

For the period 2001 to 2016, rates calculated using data from the National Coronial Information System (NCIS) are also shown, for comparison with the rates based on routine

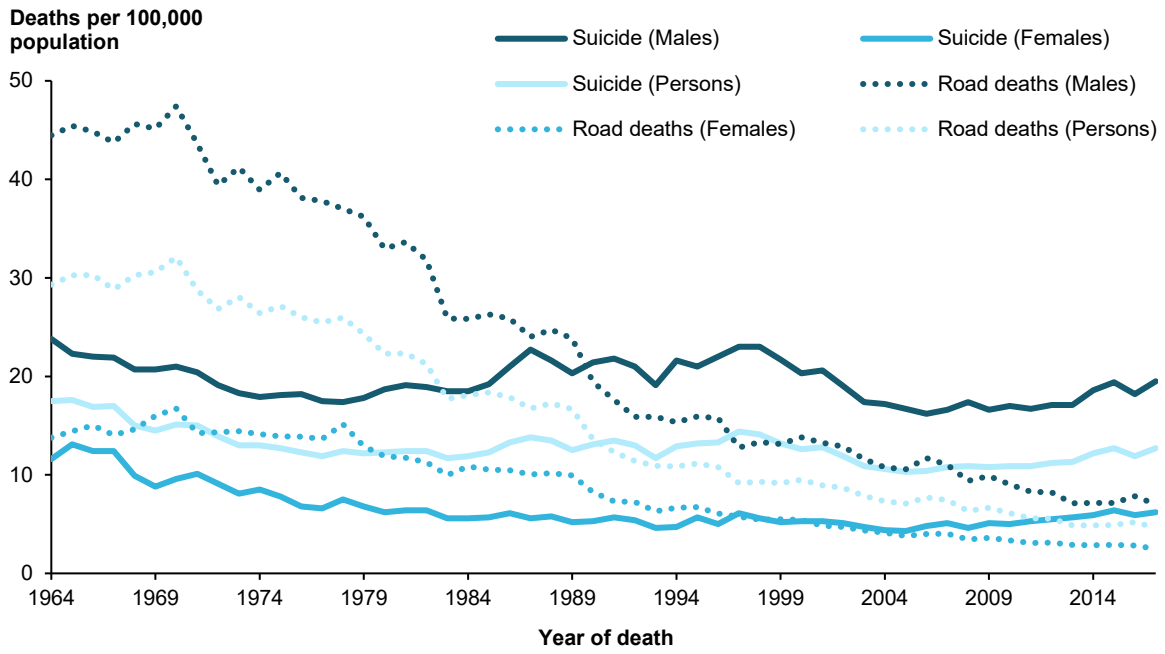
deaths data. Previous work has shown underestimation of suicide in the routine deaths data collection, particularly in years before 2006 (AIHW: Harrison & Henley 2015). Rates based on NCIS data allow for this. National NCIS values are not available before 2001 and changes in the ABS method greatly reduced the difference between the sources from 2006.

Comparison of suicides and road deaths

For much of the twentieth century, road injuries were the main external cause of death in Australia. Road safety measures resulted in a remarkable reduction in this cause after the peak in 1970 (Figure 2.2). Suicide has accounted for more deaths each year than road injuries since 1991 (Table S2.2).

For males, the road death rate was double the suicide rate at the start of the period charted and had fallen to well below half the suicide rate by recent years. A similar change occurred for females.

Figure 2.2: Suicide and road death rates, by sex, Australia, 1964 to 2017



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S2.2.

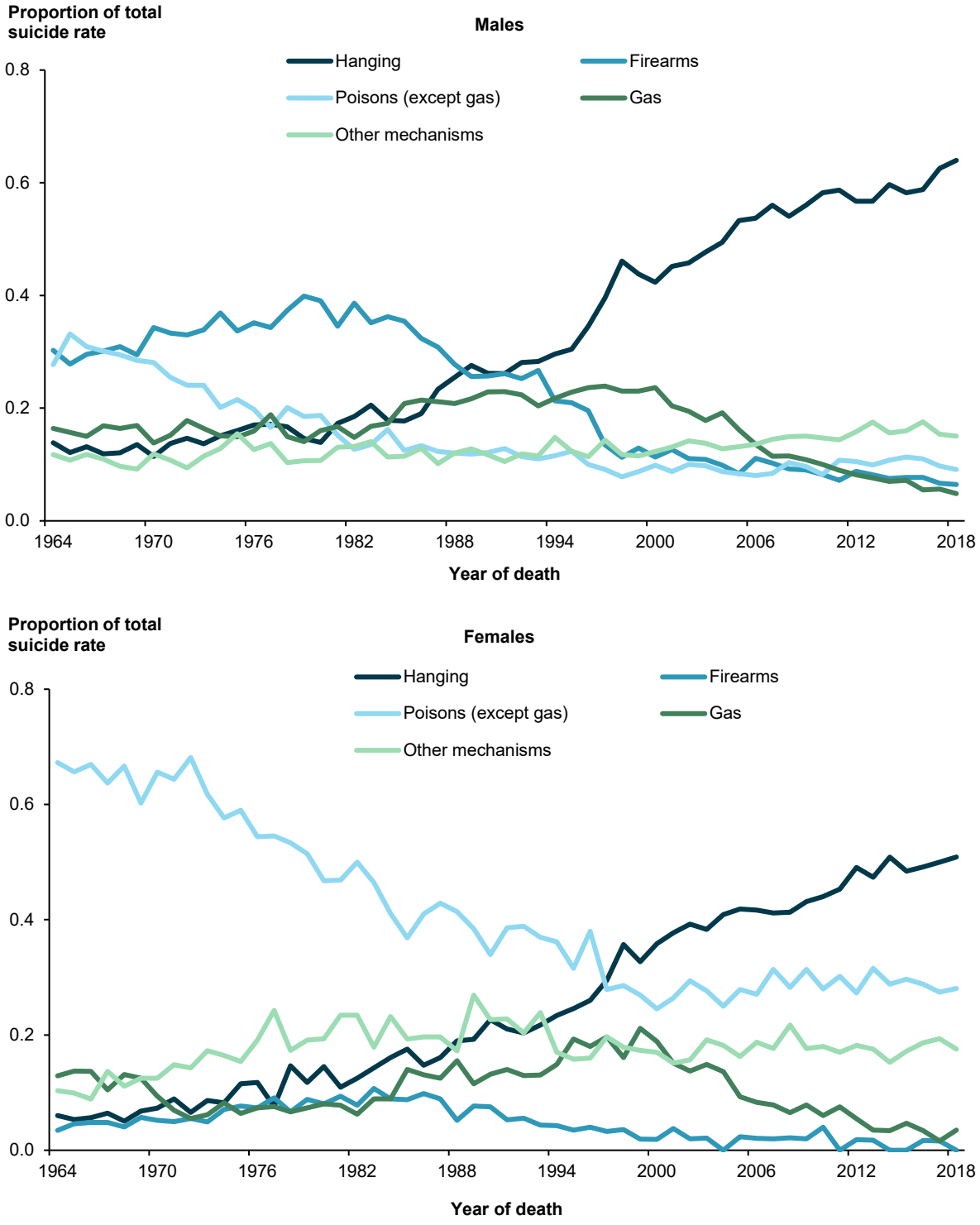
Source: AIHW National Mortality Database.

Mechanism-specific proportions by year and sex

The pattern of suicide deaths by different mechanisms changed greatly during the period from 1964 to 2018. Figure 2.3 provides an overview, and each of the mechanisms shown here is considered in more detail in a later chapter.

For both males and females, hanging has become by far the leading mechanism of suicide in Australia. For males, the proportion of suicides due to hanging rose from 14% in 1964 to 64% in 2018. Corresponding values for females are 6% and 51%. The percentage of suicides that were due to poisoning by substances other than gas decreased markedly in the early part of the period for both males and females, while percentages of suicides that involved firearms decreased, from the late 1980s, for both genders.

Figure 2.3: Mechanism-specific proportions for deaths, for males and females, Australia, 1964 to 2018



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S2.3.

Source: AIHW National Mortality Database.

Fatal and non-fatal episodes of self-harm

Some mechanisms of self-harm, if used, are more likely to result in a fatal outcome than others. This is sometimes referred to as the lethality of mechanisms. A reason to give attention to mechanisms of self-harm and their lethality is the possibility that a rise or fall in the overall suicide rate might be due, perhaps in part, to a change in the mixture of mechanisms used in a population towards ones with lower, or higher, lethality.

Lethality cannot be observed directly using available data because there is no comprehensive source of data on episodes of intentional self-harm. Available data in Australia allow lethality to be estimated, or approximated, using deaths data and hospital admitted episode data. The term *case fatality percentage* is used here for this proxy measure of case lethality.

This section provides a brief analysis of instances of intentional self-harm for the period from 1994 to 2017 where the person either died or was admitted to hospital. *Non-fatal episodes* are cases where the person was admitted to hospital as a result of intentional self-harm and did not die while in hospital. *Total episodes* of intentional self-harm are the sum of the number of suicides and the number of non-fatal episodes of intentional self-harm. *Case fatality percentages* were calculated by dividing the number of suicides by the total episodes of intentional self-harm and converting values to percentages.

Appendix B provides further analysis of fatal and non-fatal episodes of self-harm by sex, age group, year of episode and method of self-harm. Assessment begins with 1994 because the national data collection on hospital admitted cases was not well-established before that time.

A limitation of this method flows from a weakness of the classifications used to code causes of death (ICD-10) and hospitalisation (ICD-10-AM). The classifications have categories for intentional self-harm, but do not allow a distinction to be made between cases with suicidal intent and other forms of intentional self-harm. Hence, the *Case fatality percentages* are based on data for both suicidal and other intentional self-harm, a distinction that is more important for hospital data than deaths data.

Mechanism-specific rates and proportions

Intentional self-harm due to poisoning by solids and liquids had by far the highest crude rate of non-fatal episodes of any suicide mechanism over the period from 1994 to 2017 (Table 2.1). The rate of 97 episodes per 100,000 population was almost 7 times as high as the next highest rate of 14 episodes per 100,000 population for intentional self-harm involving contact with a sharp object.

Intentional self-harm due to poisoning by solids and liquids had the lowest case fatality percentage of any major suicide mechanism (1.7%) resulting in a relatively low crude rate of fatal episodes, 1.7 per 100,000 population. Note that this overall value for poisoning reflects the low lethality of the substances that were used commonly. Some poisons are highly lethal, but were not used commonly for self-harm in Australia.

Suicide mechanisms with high case fatality percentages included firearms (86%), hanging (72%) and drowning (71%). The high case fatality percentage for intentional self-harm involving hanging, combined with its frequency, resulted in this mechanism having the highest rate of fatal episodes (5.7 episodes per 100,000 population).

Case fatality percentage over time

Figure 2.4 shows case fatality percentages by mechanism of intentional self-harm over the period from 1994 to 2017. Despite fluctuations, there is considerable stability over the period in the mechanisms associated with high mortality, or with low mortality.

The highest case fatality percentage was recorded for intentional self-harm using firearms which remained at between 80% and 90% over the period from 1994 to 2017. Other mechanisms of intentional self-harm with persistently high case fatality percentages were hanging, drowning and jumping before a moving object. Mechanisms with the lowest case fatality percentages were poisons (except gas) and contact with a sharp object, which both hovered around 2% over the period. As the latter 2 mechanisms accounted for the great majority of episodes of hospitalised intentional self-harm, the overall case fatality percentage for intentional self-harm by all mechanisms remained relatively low, at close to 10%, over the period. One mechanism, gases, showed a downward trend in fatality percentage. The great majority of gas suicide cases in this period involved motor vehicle exhaust. Increasingly stringent emission controls during the period can be expected to have reduced the average toxicity of exhaust gas, by reducing its carbon monoxide content. Perhaps this explains the declining case fatality percentage.

Table 2.1: Mechanism-specific rates and proportions of intentional self-harm, Australia, 1994 to 2017

	Rate[(a)]				
Mechanism	**Total episodes**	**Fatal episodes**	**Non-fatal episodes**	**Case fatality (%)**	**Proportion of fatal episodes (%)**
Poisons (except gas)	98.8	1.7	97.1	1.7	14.3
Gases	3.4	1.7	1.7	48.9	13.8
Hanging	7.9	5.7	2.2	72.3	47.9
Drowning	0.4	0.2	0.1	70.7	2.1
Firearms	1.2	1.1	0.2	86.3	8.9
Sharp object	14.3	0.3	14.0	2.0	2.4
Jumping from a height	1.1	0.5	0.6	49.2	4.5
Jumping before a moving object	0.6	0.4	0.2	63.5	3.3
Crash by motor vehicle	0.4	0.1	0.3	25.4	0.8
Other/ unspecified	2.2	0.3	2.0	11.3	2.1
Total	**130.4**	**12.0**	**118.4**	**9.2**	**100.0**

(a) Total, fatal, and non-fatal episodes are average annual crude rates per 100,000 population for the combined 24-year period from 1 January 1994 to 31 December 2017.

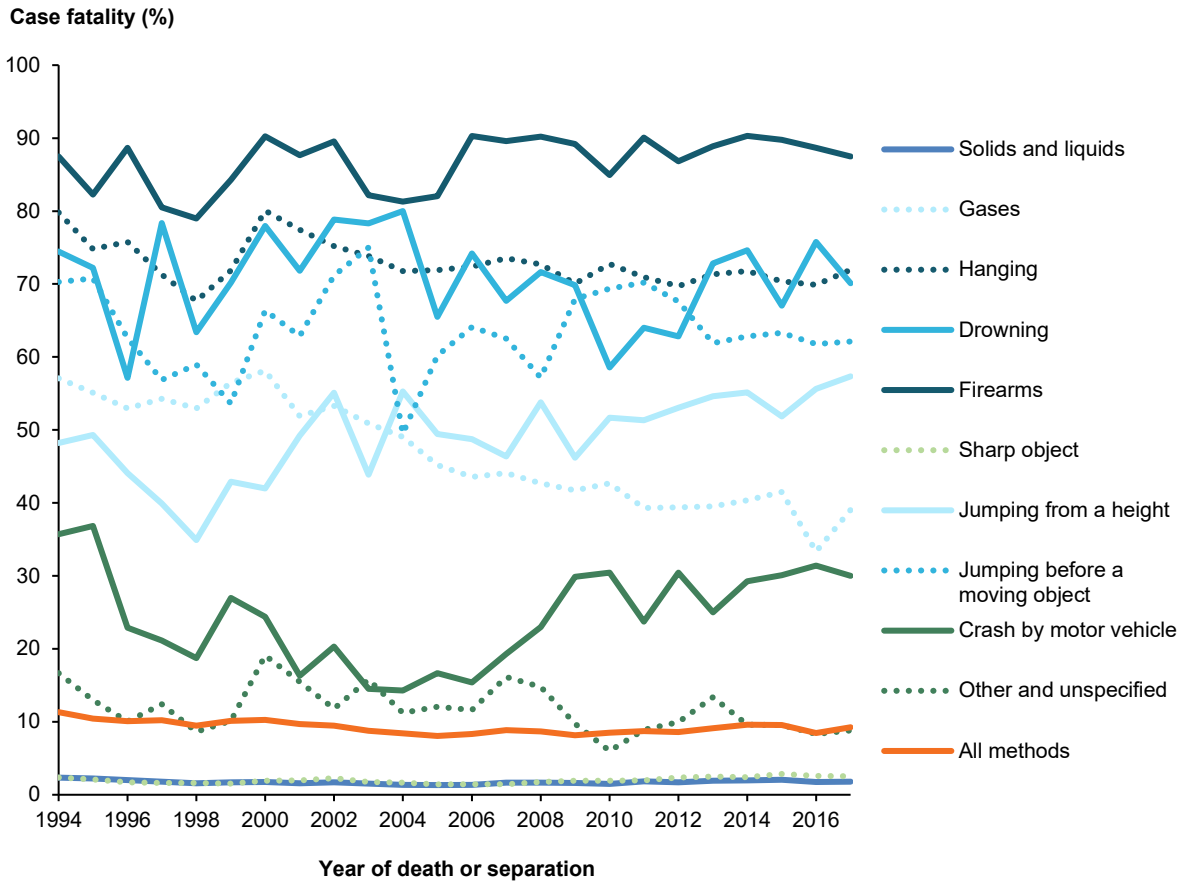
The overall case fatality percentage was much higher for males (17.1%) than for females (4.8%), a difference that is more-or-less in line with that of the population-based suicide rates for males (19.5 per 100,000 in 2017; Figure 2.1) and females (7.0).

Mechanism-specific fatality percentages were more similar for males and females than the overall values. For example, the rank order of mechanisms was the same for both sexes, other than reversal of those in the 9th and 10th places. Fatality percentages for each mechanism were higher for males than females, though the difference was less for some mechanisms (firearms; struck by moving object; hanging drowning) than others (poisons other than gas; sharp objects; crashing a motor vehicle).

Hence, the large difference between male and female overall fatality percentages reflects the different and more lethal mix of types of mechanism used by males, combined with somewhat higher mechanism-specific fatality proportions for males.

If the mix of mechanisms used by a population group in episodes of intentional self-harm were to change, then so might the overall suicide mortality in that group. For example, if females in Australia were to reduce their use of pharmaceutical substances in episodes of self-harm (low fatality percentage) and increase their use of hanging (high fatality percentage), while maintaining a constant population-based rate of episodes, then the overall suicide mortality rate for females could be expected to increase.

Figure 2.4: Case fatality percentage by mechanism of intentional self-harm, Australia, 1994 to 2017



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S2.4.

Sources: AIHW National Mortality Database and National Hospital Morbidity Database.

There have been marked changes in the profile, or case-mix, of mechanisms involved in suicide deaths in Australia (Figure 2.3). For both males and females, hanging (high fatality percentage) has increased greatly in prominence among total suicide deaths. For males, the main corresponding reductions in the suicide case-mix were deaths involving firearms (highest fatality percentage) and, more recently, those involving poisoning by gas (intermediate and reducing fatality percentage). For females, the main reduction in the case-mix until about the year 2000 was poisoning other than by gas (low fatality percentage). Since then, the prominence of poisoning by gas cases has reduced as hanging increased.

In summary, for males the changing mechanism case-mix replaced high and moderately high lethality mechanisms of self-harm with another high-lethality mechanism. For females, however, the main effect of change has been to replace a generally low-lethality mechanism (poisoning by pharmaceuticals) with a much more lethal one (hanging).

Age-standardised suicide rates for both males and females have tended to rise in recent years (Figure 2.1). The different and changing patterns of mechanisms used for suicide by males and females raise the possibility that different explanations might underlie the recent rises for males (increasing episodes of self-harm) and for females (increasing average lethality of episodes). The lack of robust population-based data on total episodes of intentional self-harm prevents direct examination of this possibility.

Table B1.1 in Appendix B provides further summary data on fatal and non-fatal episodes of intentional self-harm in the period from 1994 to 2017.

Trends by age group and sex

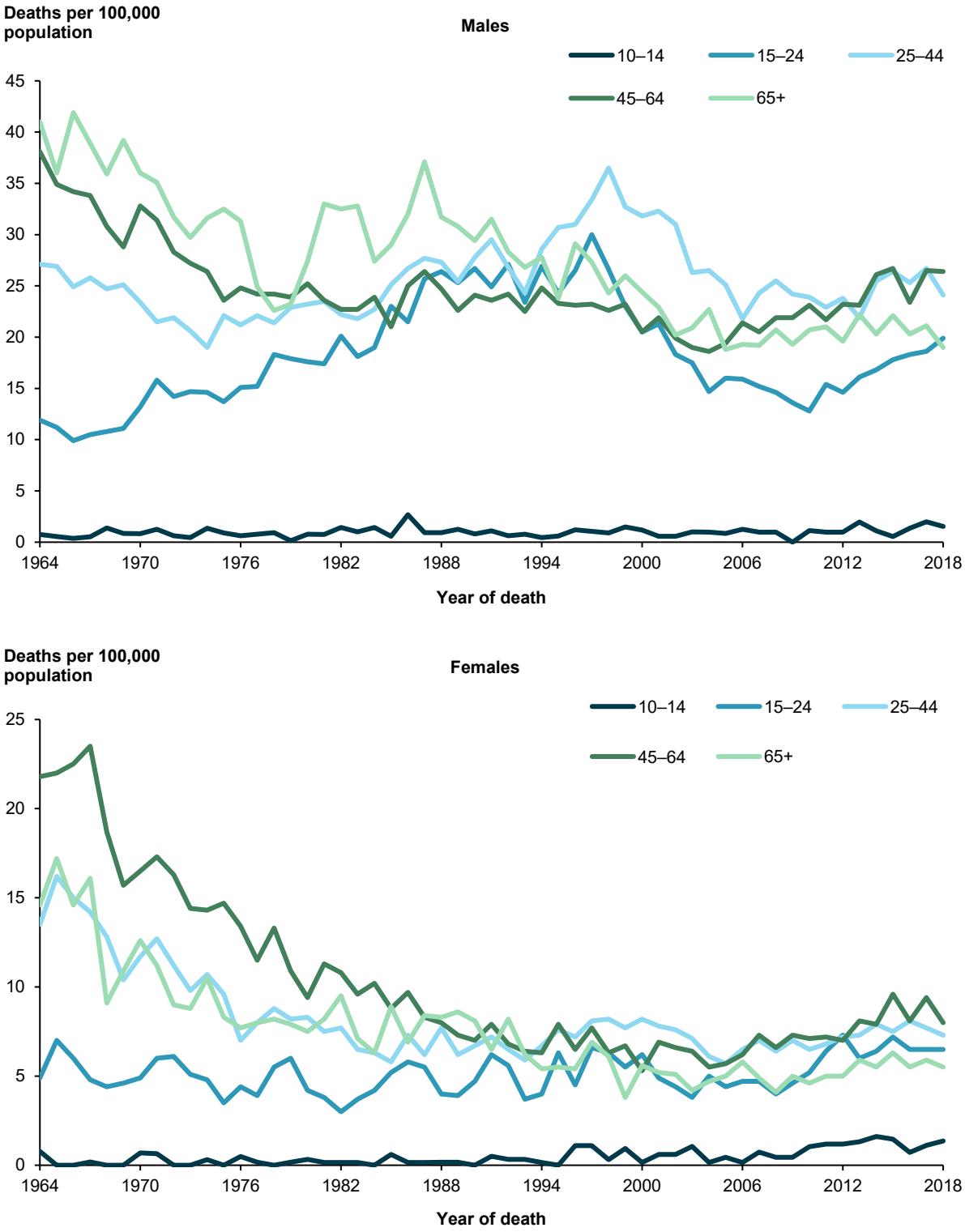
The age distribution of annual suicide rates in Australia changed considerably over the period from 1964 to 2018 (Figure 2.5). Rates differed markedly by age group at the beginning of the period. Apart for boys aged 10–14 (for whom rates were low throughout), age-specific rates tended to converge towards the middle of the period.

For example, in 1964 the rate for men aged 65 and over (41 deaths per 100,000 population) was almost 3.5 times as high as rates for males aged 15–24 (11.9 deaths per 100,000 population). By the middle of the period, the rates for these 2 age groups were similar, hovering around 25–30 deaths per 100,000 population. Rates by age groups, apart from boys aged 10–14, showed some divergence in the latter part of the period, but were broadly similar by 2018.

Suicide rates for females by age groups also showed convergence during the first part of the period, due to declines for groups aged 25–44 and older. Rates fell markedly for women aged 45–64 from 23.5 deaths per 100,000 population in 1967 to 6.3 deaths per 100,000 population in 1994. In contrast, rates for females aged 15–24 fluctuated around 5 deaths per 100,000 population over the entire period from 1964 to 2018.

Note that the period shown in Figure 2.5 begins near the peak of mortality due to suicide by poisons other than gases, which raised the overall suicide rate, especially the female rate (see Figure 2.1 and Chapter 5).

Figure 2.5: Male and female suicide rates, by age group, Australia, 1964 to 2018



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S2.5.

Source: AIHW National Mortality Database.

Trends by birth cohort

The mortality data presented above by period of death can also be presented so as to show rates according to the periods in which people were born. A ‘birth cohort’ refers to everyone born in a particular period. Birth cohorts can be defined in terms of any range of birth dates for which data are available.

The cohorts used in this report are the people who were born in each 5-year period beginning with 1954 to 1958 and ending with 2004 to 2008. The first cohort (born 1954 to 1958) and the second (1959 to 1963) were born before 1964, the first year for which unit-record cause of death data are available. They are included because analysis of suicide mortality is limited to deaths at ages 10 years and older (mortality from suicide at younger ages is very low and has controversial meaning). The last cohort included (born 2004 to 2008) is the most recent whose mortality at ages older than 10 years is covered by the data available for this report.

Each line in Figure 2.6 shows how suicide rates changed with age for people born into a particular cohort. In this figure, cohort-specific rates are shown by age at death in 5 year bands from 10–14 to 60–64 (the age that had been reached by the cohort born 1954–58 at the end of the study period). This arrangement of cohort data facilitates comparison between cohorts of suicide rates over the life course. The upper panel shows data for males and the lower for females.

The general pattern is that suicide rates rose rapidly from a low level at age 10–14 to a much higher rate in early adulthood. Particular cohorts show variations from the general pattern. For example, 3 male cohorts (born 1959–73) experienced peaks in suicide rates in early adulthood, after which their rates declined somewhat. Such a peak is less marked, or absent, for other male cohorts and female cohorts. The wide differences between male cohorts in suicide rates early in adulthood had become much smaller by middle adult ages (Figure 2.6).

Suicide rates have risen somewhat less with age for the more recent male cohorts. For example, the cohort born in 1989–93 had rates at ages 20–24 and 25–29 that were little more than half of the rates at the same ages for the cohort born in 1969–73. The passage of time will reveal whether the rates for these more recently born cohorts of males remain relatively favourable as they reach older ages. Notably, while the male cohorts born 1974–78 and 1979–83 did not have a peak in early adulthood, their rates were trending upwards at the end of the available data.

For females, the pattern has been broadly similar for all cohorts considered here. Suicide mortality rates rose steeply from low levels at 10–14 to 15–19, then more slowly at older ages. The rates were generally much lower than for males. The highest female suicide rates observed are for those born in the same two 5-year periods as the male cohorts whose rates peaked highest (1964–68 and 1969–73). Rates for these cohorts of females have tended to rise with age, whereas rates for the males dropped somewhat after the peak in early adulthood.

The youngest male cohorts for which more than one data-point is available (1994–98; 1999–03) have so far followed a similar course to the 2 cohorts before them. In contrast, the youngest female cohorts with 2 or more data points have had the steepest rise of any female cohorts. Rates at age 15–19 remain lower than those of their male peers, but the difference is smaller than for earlier-born cohorts.

Figure 2.7 shows cohort-specific lines aligned in terms of period of death. This arrangement helps to reveal period-related events or processes. Rates for most cohorts dipped at the point corresponding to the period near 2005, when underestimation of suicide due to the matters discussed in an earlier report was at its greatest (AIHW: Harrison & Henley, 2015).

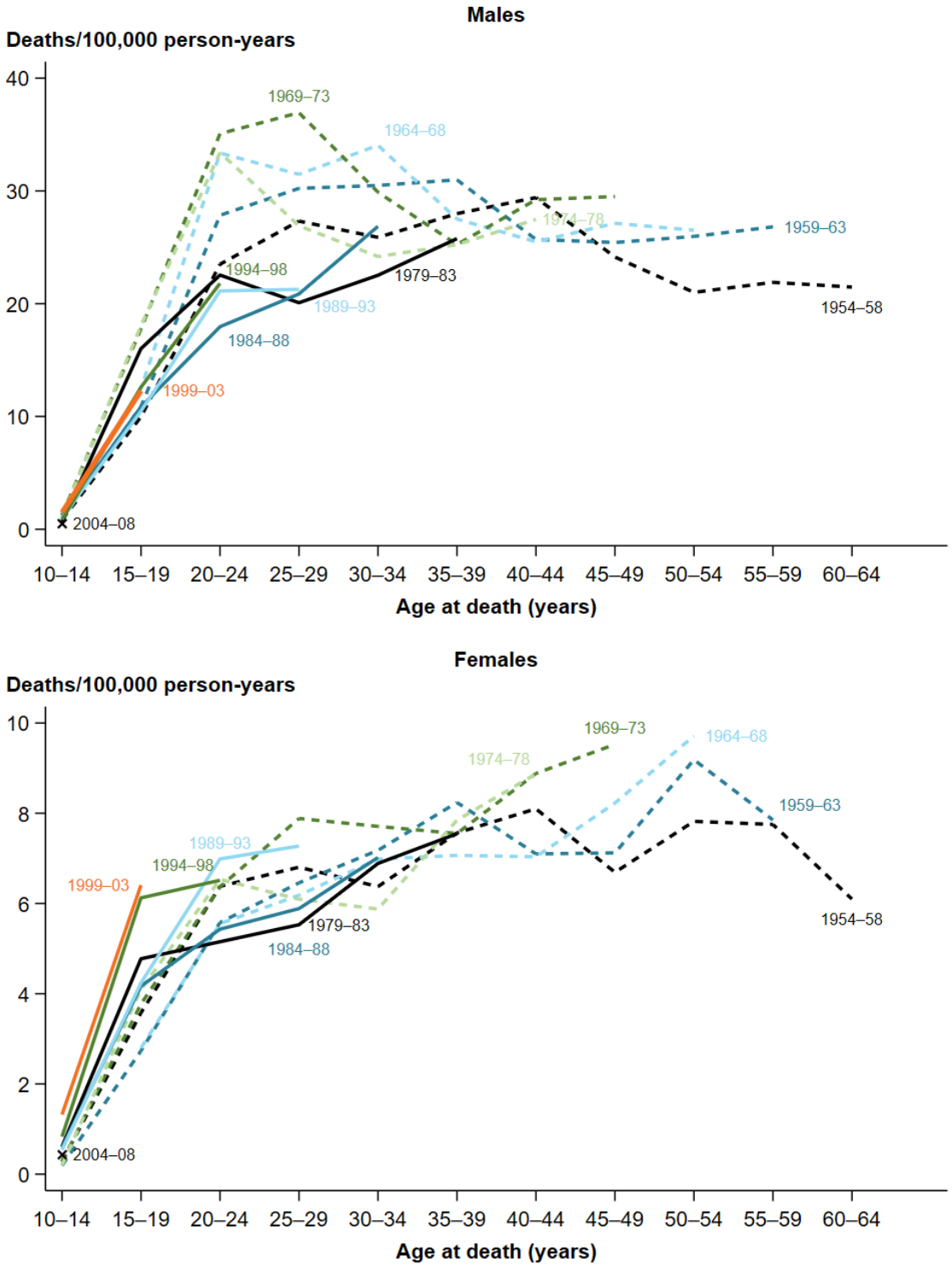
Figure 2.7 is based on the same data, but organised in terms of period of death. The same deaths are in each cohort, but grouped according to 5-year periods of death. The first period is 1964–68, when members of the oldest cohort (born 1954–58) reached age 10, and the last is 2014–18. This arrangement of cohort data facilitates identification of changes that affected all cohorts, or several, at the same time. These are known as period effects.

The focus of this report is death in the period from 1964 forwards, the period for which electronic unit record cause of death data are available for Australia. Summary tables of deaths data, which exist for earlier periods, can also be analysed in terms of birth cohorts, though with some limitations and approximations. A previous report included tabular deaths data registered in the years 1921 to 1963 (AIHW: Harrison & Henley 2014). Some figures from that report have been included in this report, as Appendix C, to provide context.

Figure C1.1 shows birth cohort data over a longer period, as published in the previous report. As with Figure 2.6, cohort-specific lines in this figure are aligned in terms of age of death, but with earlier-born birth cohorts extending over a longer period. The period of birth for each cohort named in the Appendix C figures is given in Table C1.1.

For males, Figure C1.1 shows that suicide rates rose further and faster at ages 15 to mid-20s for Baby Boomer, Gen X and Gen Y birth cohorts than in the generation of their fathers and grandfathers. For females, rates at ages 15 to mid-20s were more similar between cohorts than for males. Differences emerged at later ages, largely reflecting the age of cohorts in the 1960s, during the epidemic of poisoning deaths (see Chapter 5).

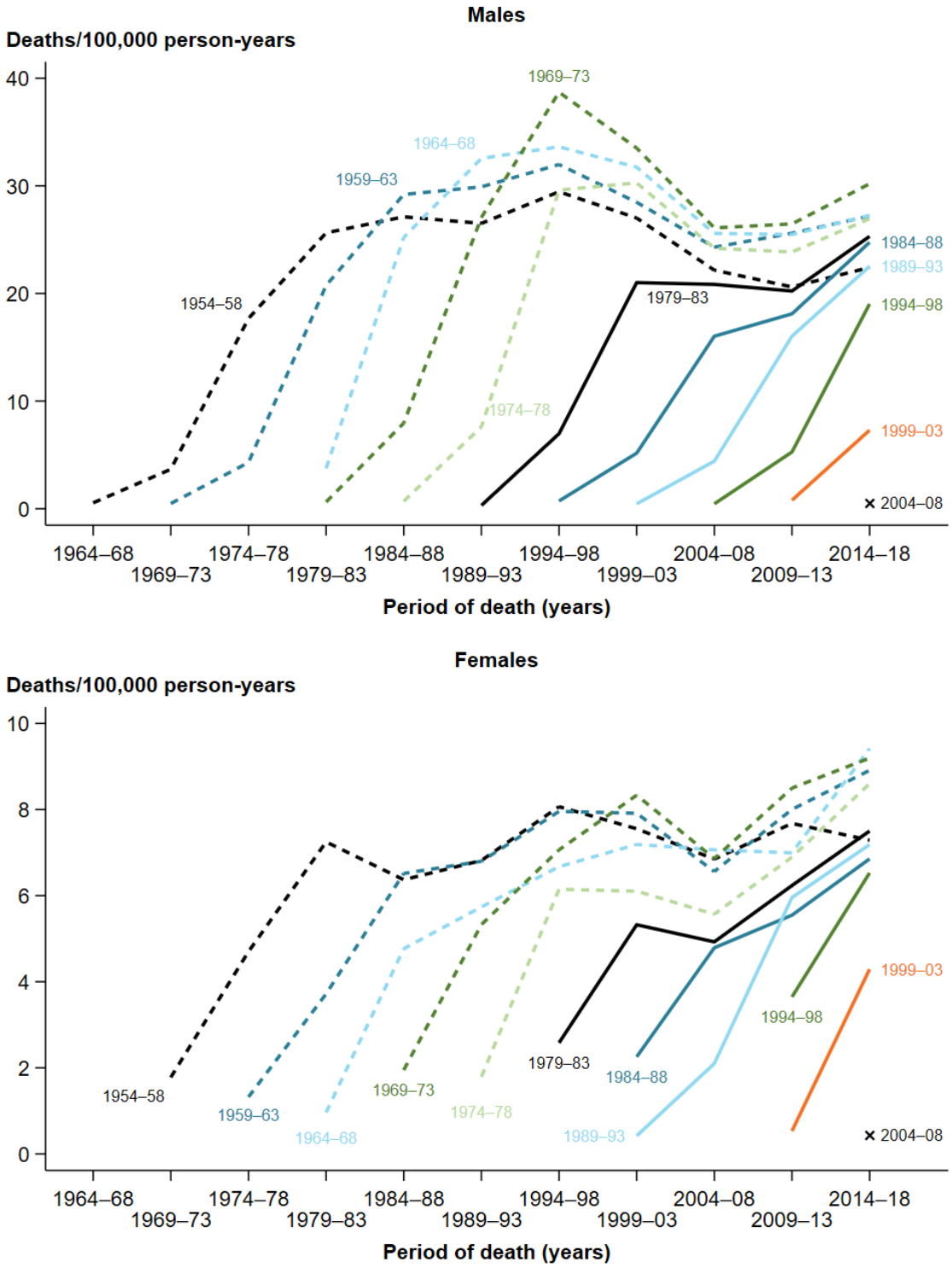
Figure 2.6: Male and female rates of suicide, by period of birth and age at death, Australia, 1964 to 2018



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S2.6.

Source: AIHW National Mortality Database.

Figure 2.7: Male and female rates of suicide, by period of birth and period of death, Australia, 1964 to 2018



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S2.7.

Source: AIHW National Mortality Database.

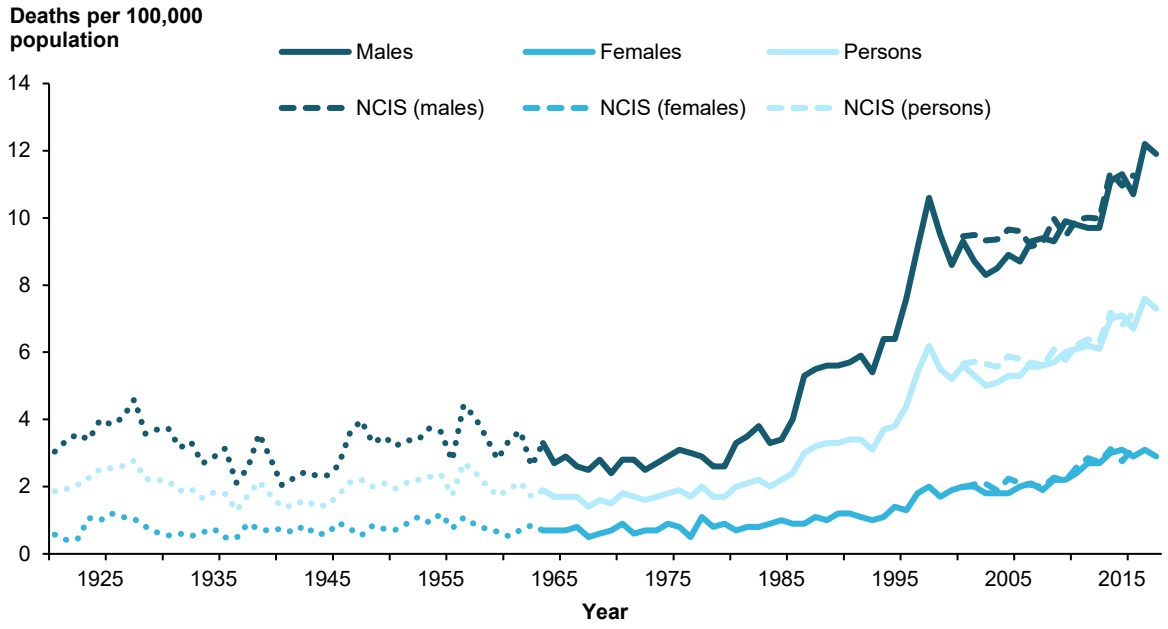
3 Trends in suicide by hanging

In 1964 hanging was the mechanism of 16% of male suicides and 6% of female suicides. By the end of the period covered by this report hanging had become the predominant mechanism, accounting for nearly 2/3 of male suicide deaths and over half of female cases. It is especially prominent in more recently-born cohorts.

Age-adjusted male rates for suicide by hanging fluctuated around 3 deaths per 100,000 population between 1921 and the early 1980s before rising markedly to around 12 deaths per 100,000 population by 2018 (Figure 3.1). A similar pattern was observed for females, although at a lower level. As shown earlier (Figure 2.3), hanging has been the most common mechanism of suicide in Australia since 1989 for males and 1997 for females.

Rates between 2001 and 2016 calculated using data from the National Coronial Information System (NCIS) are also shown for comparison purposes (see page 3 and Appendix A). The NCIS-based rates provide a better guide to rates in the several years before 2006, after which both sources give similar values.

Figure 3.1: Suicide rates due to hanging, by sex, Australia, 1921 to 2018



Notes:

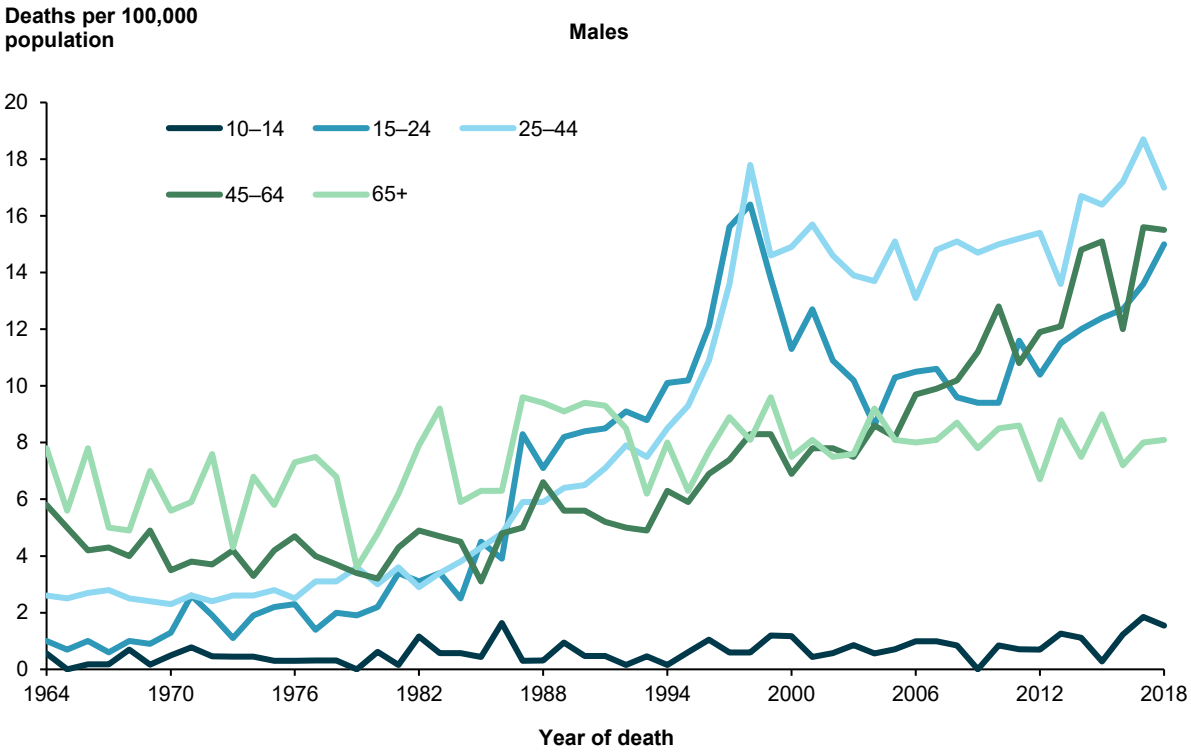
1. Rates for 1921 to 1963 are by year of registration (dotted line) and rates for 1964 to 2018 are by year of death (solid line).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table S3.1.
3. Deaths from all causes of Australian service personnel while overseas during World War 2 were not included in Australian deaths data. However, population estimates for the period do not allow for their absence, so the charted rates are underestimates, especially for males.

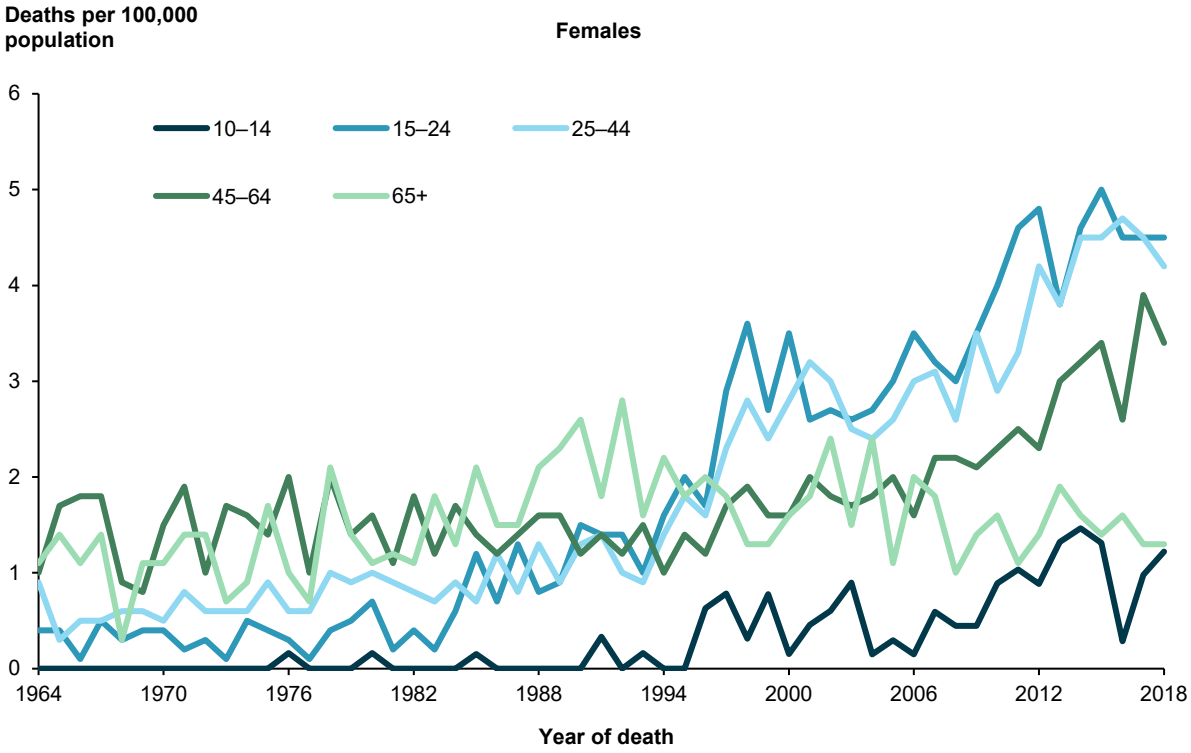
Source: AIHW National Mortality Database.

Trends by age group and sex

There was significant variation in the patterns of male rates for hanging suicide by age group over the period from 1964 to 2018. Rates for males aged 15–24 and 25–44 rose sharply between the early 1980s and late 1990s before dipping and then rising again towards the end of the period. Despite fluctuation, rates for men aged 45–64 were relatively steady until the late 1980s after which they rose markedly until the end of the period.

Figure 3.2: Male and female suicide rates by hanging, by age group, Australia, 1964 to 2018





Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S3.2.

Source: AIHW National Mortality Database.

Rates for females aged 15–24, 25–44 and 45–64 rose markedly in the latter half of the period between 1964 and 2018 although the rise in the oldest of these age groups was not as steep as for the 2 younger age groups. Rates also rose in the latter half of the period for girls aged 10–14, although case numbers were low.

Trends by birth cohort

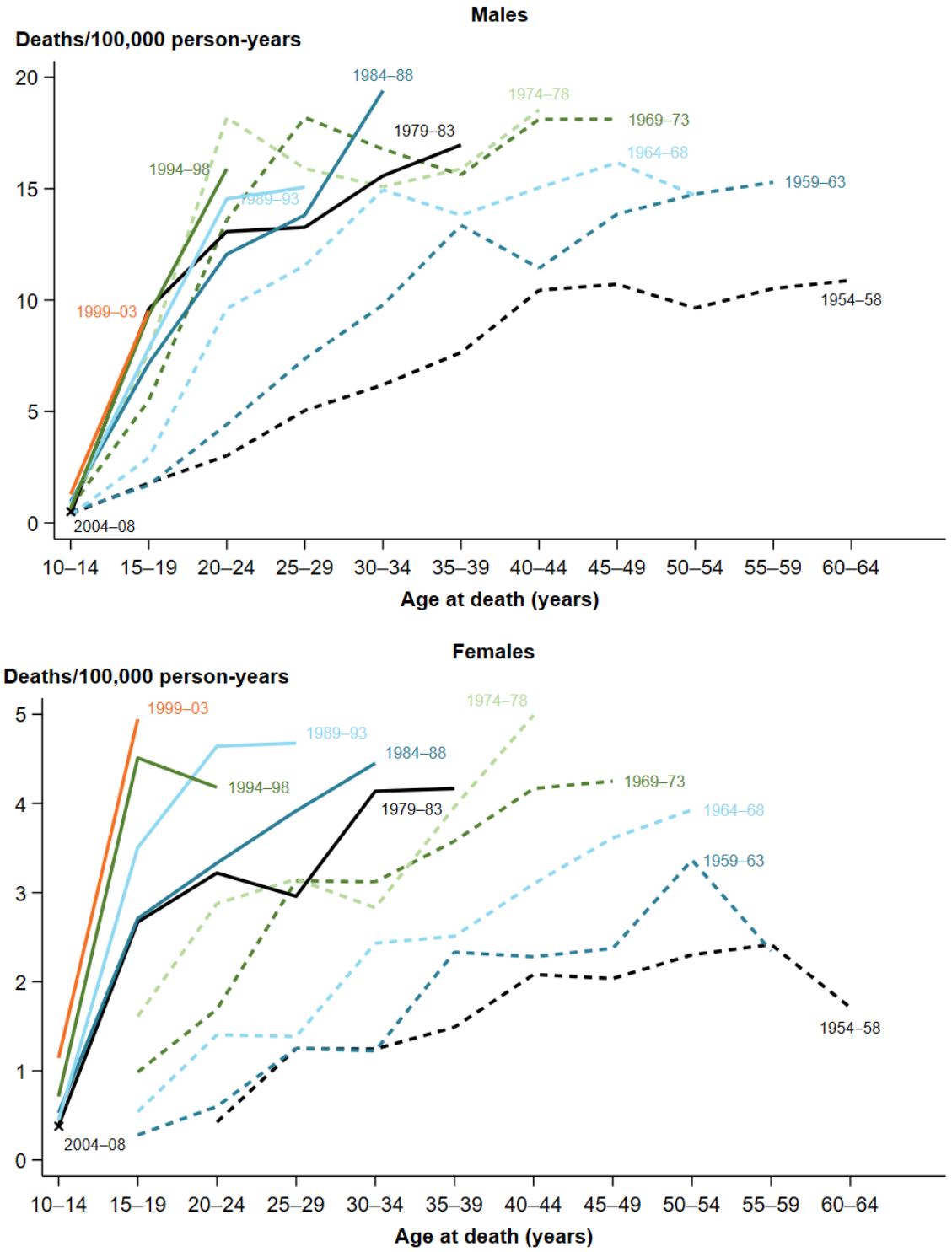
For males in the oldest cohort (born 1954-58) the rate of suicide by hanging rose gradually with age to about 10 cases per 100,000 population at ages 40-45, after which the rise ceased (Figure 3.3). The next 3 male cohorts show a similar pattern, but each had a steeper rise to a higher rate of hanging suicide. The rate of rise from 10-14 to 20-24 has been steep for all more recently-born male cohorts, none steeper than the most recently-born cohorts for which more than one data point is available (1994-98 and 1999-2003).

A similar pattern is present for female cohorts, though with a clearer progression to steeper rises in rates at young ages for each more recently-born cohort (Figure 3.3). Rates of suicide by hanging reached at age 15-19 by the youngest female cohorts (born 1994-98 and 1999-2003) are as high as, or higher than, the rates reached by earlier female cohorts at any age for which data are available.

Figure C1.2 shows birth cohort data over a longer period, from 1921 to 2010 as published in a previous report (AIHW: Harrison & Henley 2014). The figure is republished here to provide context for the data in Figure 3.3. As with Figure 3.3, cohort-specific lines are aligned in terms of age of death, but with rates for older birth cohorts extending over a longer age-range. The period of birth for each cohort named in this table is given in Table C1.1 (Appendix C).

For Australians born in the last third of the 20th century, rates of suicide by hanging rose rapidly with age, reaching levels from about age 25 onwards that were several times the rates of the earlier generations at the same age.

Figure 3.3: Male and female rates of suicide by hanging, by period of birth and age at death, Australia, 1964 to 2018



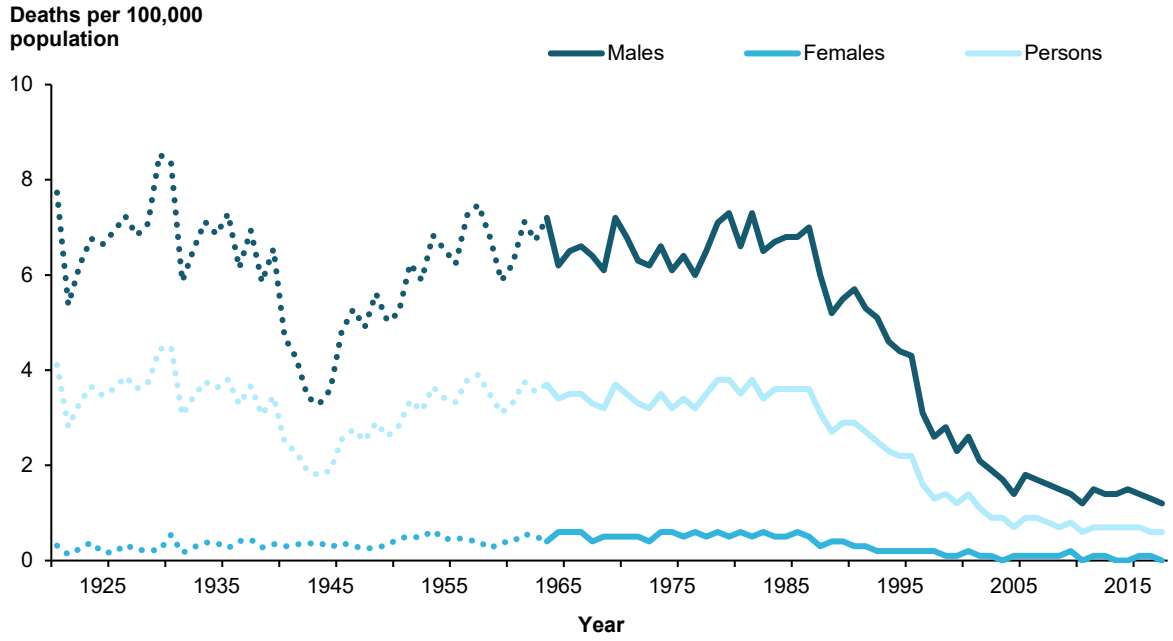
Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S3.3.

Source: AIHW National Mortality Database.

4 Trends in suicide by firearms

Shooting by firearms was the most common mechanism of suicide by males in Australia in the 20th century until the mid-1980s (figures 2.3 and 4.1). Apart from the period of WW2, when a statistical aberration largely accounts for the transient dip (Figure 4.1, note 3), the age-adjusted rate for males was generally 6 deaths per 100,000 population or higher until the late 1980s, after which it declined significantly, to below 2 per 100,000 population. Rates for females remained at 0.6 deaths per 100,000 population or lower across the entire period from 1921 to 2018 and at 0.2 deaths per 100,000 population or lower from the early 1990s onwards.

Figure 4.1: Suicide rates due to firearms, by sex, Australia, 1921 to 2018



Notes:

1. Rates for 1921 to 1963 are by year of registration (dotted line) and rates for 1964 to 2018 are by year of death (solid line).
2. Data underpinning this figure are available in the supplementary spreadsheet Table S4.1.
3. Deaths from all causes of Australian service personnel while overseas during World War 2 were not included in Australian deaths data. However, population estimates for the period do not allow for their absence, so the charted rates are underestimates, especially for males.

Source: AIHW National Mortality Database.

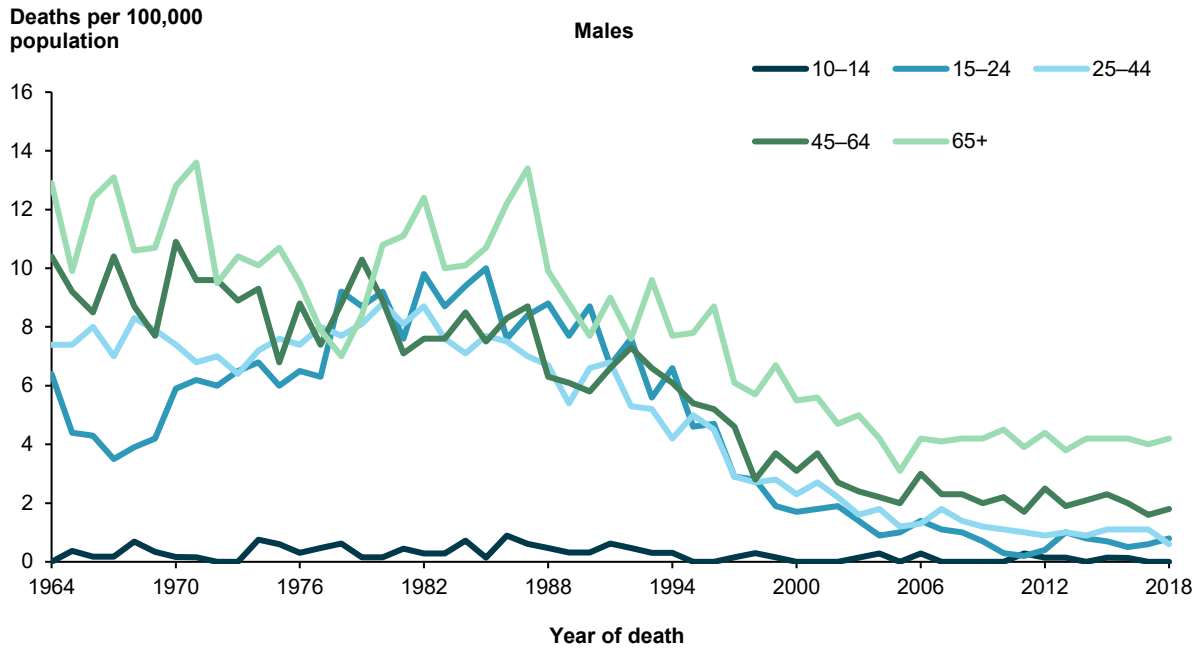
Trends by age group and sex

In the first part of the period from 1964 to 2018 rates of suicide by firearms were generally higher for older men than for younger men.

Rates for all age groups except boys aged 10–14, and to some extent men aged 65 and over, were broadly similar through the period from the mid-1970s onwards. Rates in all 4 of the oldest age groups fell markedly from the late 1980s through to the early 2000s.

Rates for female suicide using firearms are not presented because case numbers are low (averaging 22 per year overall and 9 per year from 2000) and rates are unstable.

Figure 4.2: Male suicide rates by firearms, by age group, Australia, 1964 to 2018



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S4.2.

Source: AIHW National Mortality Database.

Trends by birth cohort

The 3 male cohorts born earliest (i.e. 1954–58 to 1964–68) showed a steep rise in firearm suicide rates with age to 10 cases per 100,000 or higher by age 20–24, followed by a large decline at older ages (Figure 4.3). Equivalent female cohorts show a similar pattern, but at much lower rates.

Shooting by firearms has become a much less common mechanism of suicide in Australia. Each more recently born cohort showed a smaller early peak rate for this cause of death, with no peak and low rates (1 case per 100,000 or lower) for men born in the mid-1980s and since. Rates for females in recently born cohorts are not shown because case numbers were too low for meaningful analysis at most data points.

There were 889 firearm suicide deaths before age 30 in the male cohort born in 1959-63, compared with 73 by the same age in the cohort born in 1989-93. Equivalent case numbers for females are 74 and 7 deaths.

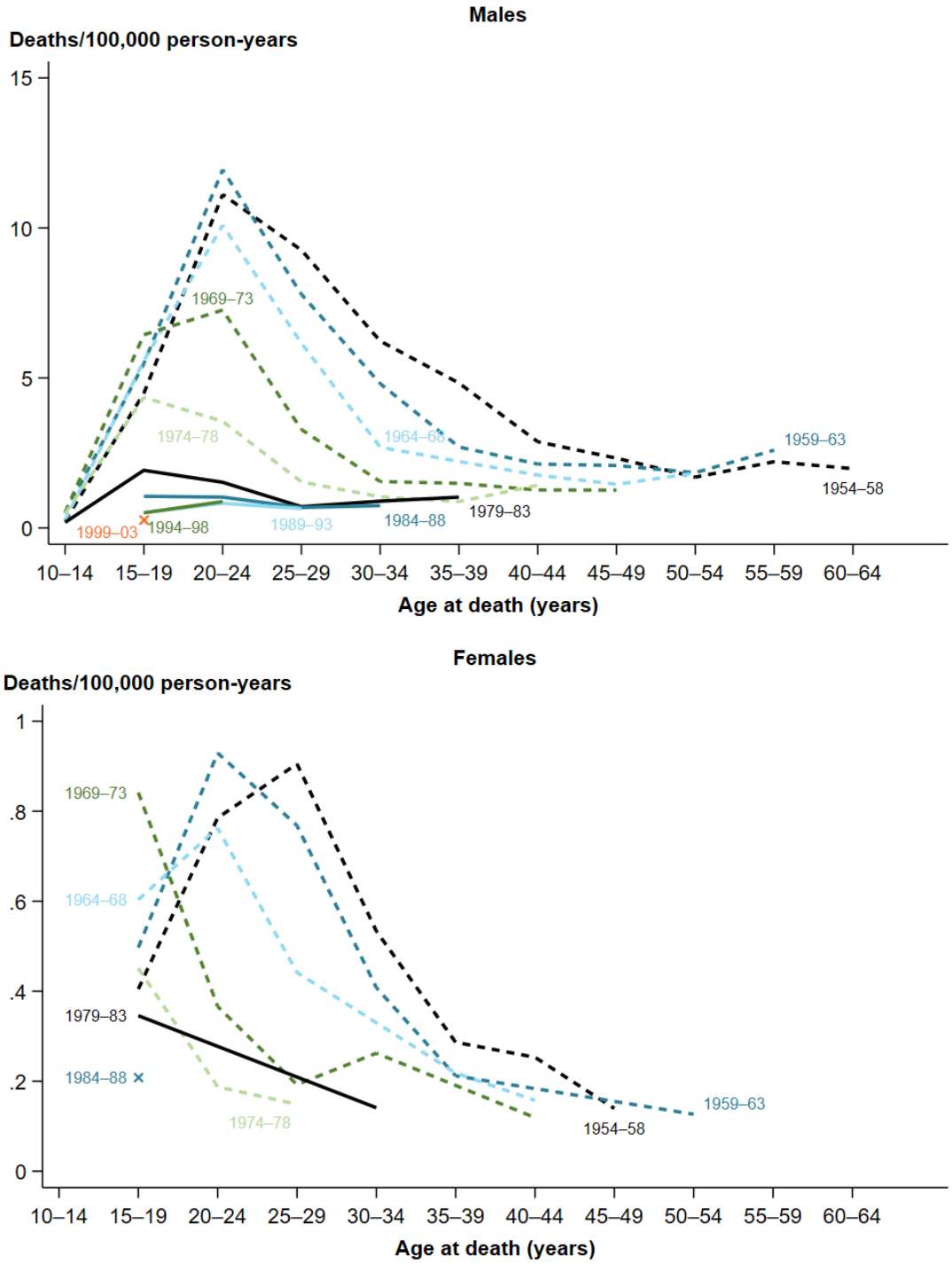
Figure 4.4 shows the same data arranged by period of death. Rates in all of the earlier-born male cohorts declined from a peak (which occurred in their 20s, as shown in Figure 4.3) to a much lower level during the period from about 1984-88 to about 1999-2003 (Figure 4.4). While the declines are not aligned exactly by date of occurrence, this suggests a period effect.

Figure C1.3 shows birth cohort analysis over a longer period, from 1921 to 2010 as published in a previous report (AIHW: Harrison & Henley 2014). As with Figure 4.4, cohort-specific lines are aligned in terms of period of death, but with the line for each birth cohort extending over a longer part of the cohort-members' life-span. The period of birth for each cohort named in this table is given in Table C1.1 (Appendix C). Note that male cohorts born in the first half of the 20th Century ('Frugal generation'; 'Lucky generation'), which had relatively high mortality from this cause in mid-life, showed declining firearm suicide rates late in life, but to rates that remained higher than those of more recently-born male cohorts. Some evidence of persistent earlier patterns can be seen in the cohorts of males born 1954-73: while rates of firearm suicide have dropped greatly for these cohorts, they remained somewhat higher than the rates for later-born cohorts at the end of the period (Figure 4.4).

Several studies have examined deaths data for indications of an effect related to the mass shooting at Port Arthur in 1996 and the regulatory changes and gun buy-back scheme prompted by it. This issue is discussed in a previous report (AIHW: Harrison & Henley 2014).

In summary, firearm suicide by males in Australia, the most common of any mechanism until the 1980s, has become uncommon, particularly in cohorts born since the 1980s. It was an uncommon mechanism of suicide by females in Australia and has become still less common.

Figure 4.3: Male and female rates of suicide by firearms, by period of birth and age at death, Australia, 1964 to 2018

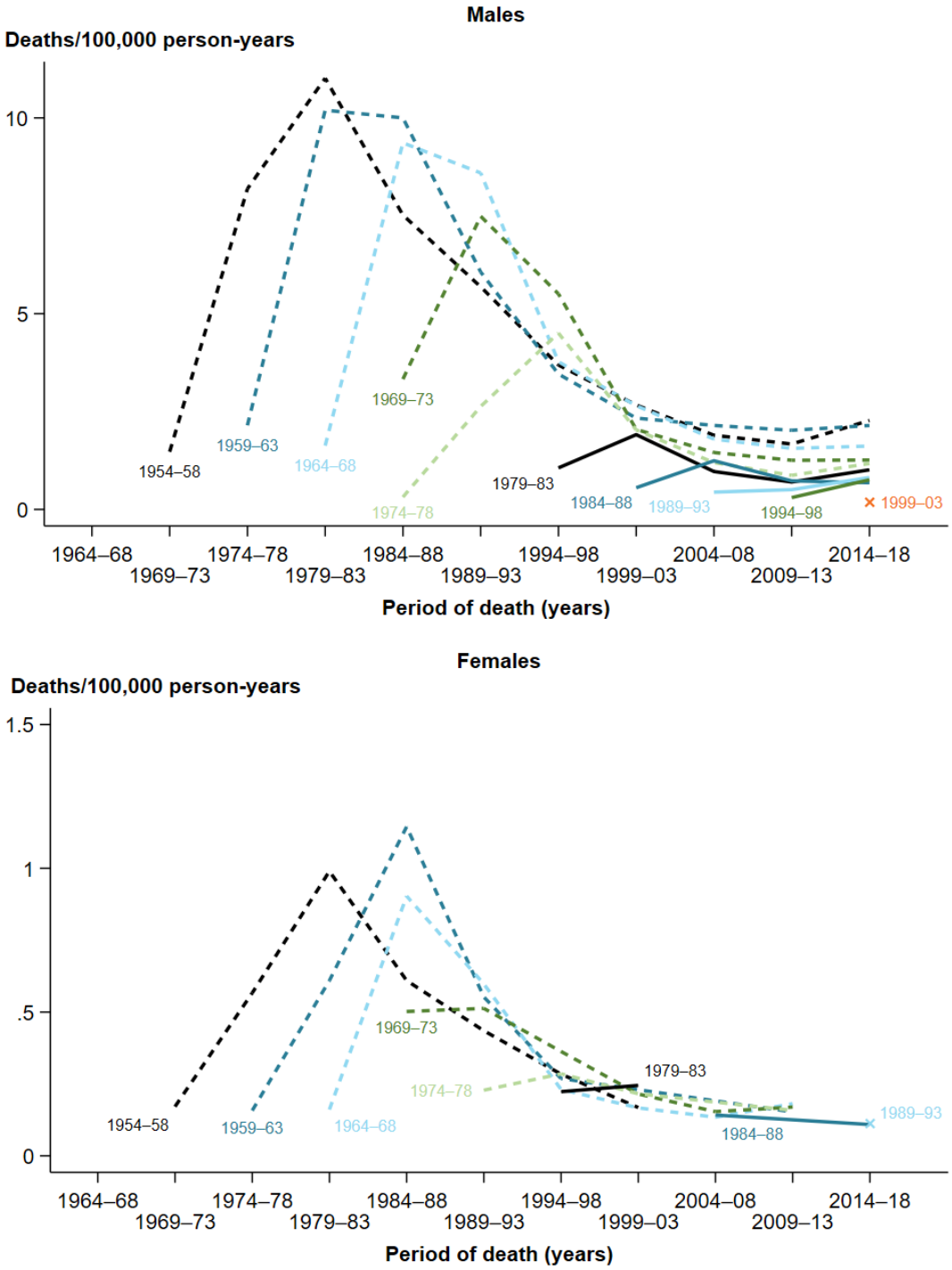


Notes:

1. Rates for some younger cohorts are not shown due to low case numbers.
2. Data underpinning this figure are available in the supplementary table spreadsheet Table S4.3.

Source: AIHW National Mortality Database.

Figure 4.4: Male and female rates of suicide by firearms, by period of birth and period of death, Australia, 1964 to 2018



Note:

1. Rates for some younger cohorts are not shown due to low case numbers.
2. Data underpinning this figure are available in the supplementary table spreadsheet Table S4.4.

Source: AIHW National Mortality Database.

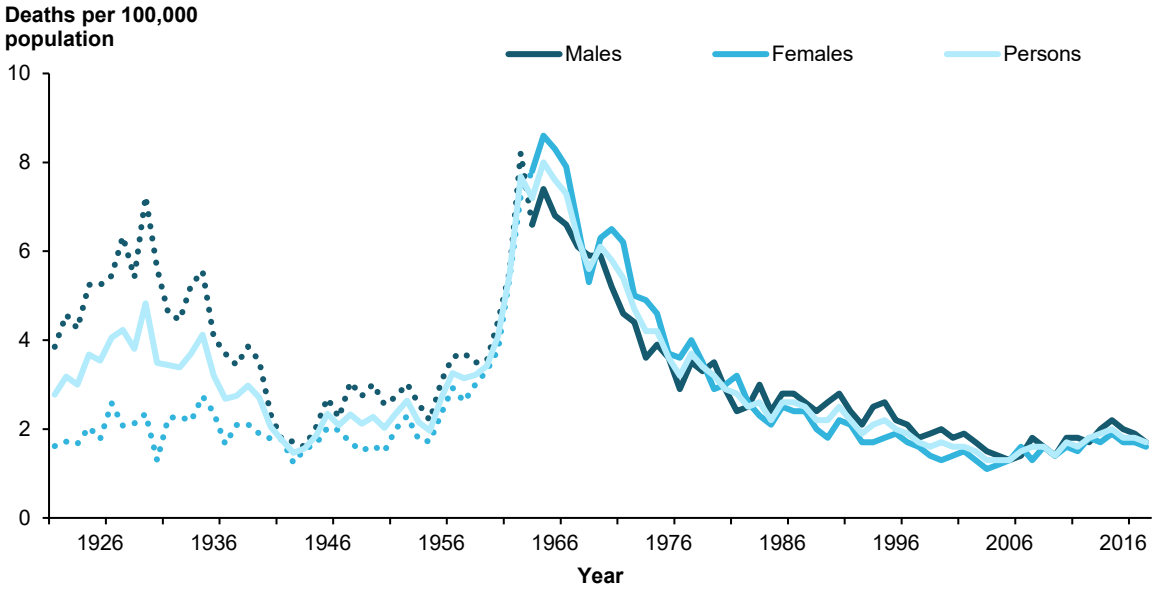
5 Trends in suicide by poisons (except gas)

This chapter includes intentional self-harm due to poisoning by solid and liquid substances including pharmaceuticals (for example, a prescribed anti-depressant medication; an anaesthetic agent; a non-prescription analgesic; a drug of dependence) and other toxic substances (for example, alcohol; pesticides; corrosive substances).

Age-adjusted rates for both female suicides due to exposure to poisons (except gas) were remarkably similar to male rates over the period from the early 1940s through to 2018 (Figure 5.1). This is noteworthy because male rates greatly exceed female rates for the other main mechanisms of suicide.

Both male and female rates were characterised by a peak during the 1960s, attributed chiefly due to barbiturate poisoning (Oliver and Hetzel, 1972). Barbiturate sedatives and hypnotics were made more widely available in 1960. Barbiturates can be lethal in amounts only a few times more than the prescribed dose. In July 1967, in response to concerns over misuse of some categories of drugs, the number of tablets or capsules of barbiturates was limited to 25 for a single prescription and no repeat prescriptions were allowed. At about the same time, barbiturates began to be replaced for some purposes by drugs with less potential for lethal overdose. Suicidal and unintentional deaths from this cause began to decline soon after.

Figure 5.1: Suicide rates by exposure to poisons (except gas), by sex, Australia, 1922 to 2018



Notes:

1. Rates for 1922 to 1963 are by year of registration (dotted line) and rates for 1964 to 2018 are by year of death (solid line).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table S5.1.
3. Deaths from all causes of Australian service personnel while overseas during World War 2 were not included in Australian deaths data. However, population estimates for the period do not allow for their absence, so the charted rates are underestimates, especially for males.

Source: AIHW National Mortality Database.

For males, there was also a peak in rates centred on 1930, which was not present in female rates. This peak coincides with that observed for overall male suicide rates (Figure 2.1).

Trends by age group and sex

Suicide rates for both males and females due to exposure to poisons (except gas) fell markedly in the first half of the period between 1964 and 2018 for those aged 25–44, 45–64 and 65 and over (Figure 5.2). This is the downward part of the peak shown in Figure 5.1. Rates for males and females aged 15–24 also declined over most of this period, but without a large decline early in the period.

Trends by birth cohort

Cohort-specific rates of suicide by *Exposure to poisons (except gas)* are shown in Figure 5.3 arranged by age at death and in Figure 5.4 by period of death.

Rates of suicide by this mechanism generally rose faster and higher in earlier-born cohorts (Figure 5.3).

Rates for the 2 earliest-born male birth cohorts (that is, those born 1954–58 and 1959–63) rose at about the same rate, to a peak at 25–29 years of age. The rate at this age was lower for more recently-born cohorts and the peak in early adulthood was less marked.

Patterns for male cohorts born 1979-83 and later are similar to one another and different from the earlier cohorts. Rates were generally lower than in earlier cohorts at the same age and rose more or less in line with increasing age. Rates in all of these cohorts were trending upwards at the end of available data.

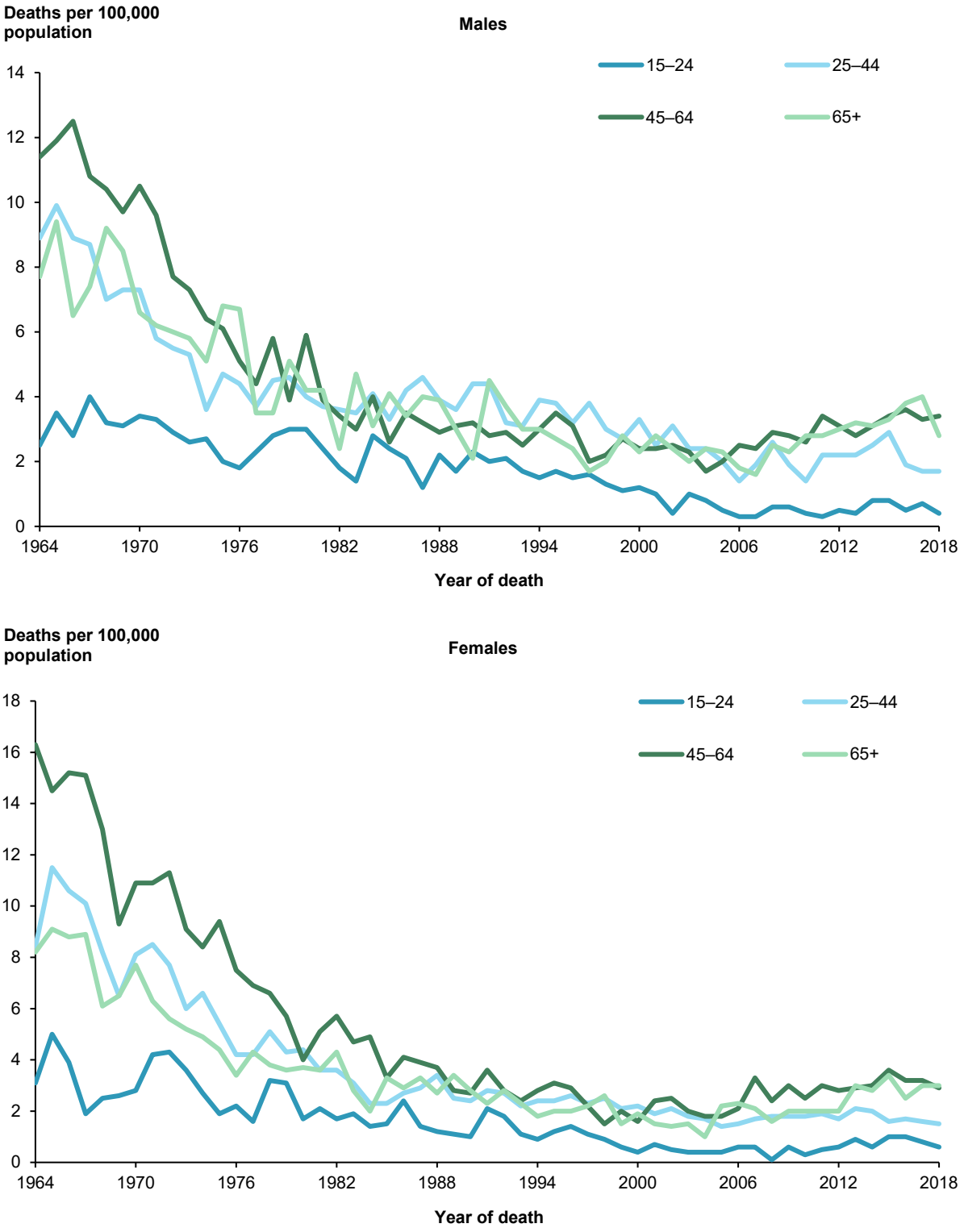
Largely similar patterns are present for females.

Rates for most cohorts dipped at the point corresponding to the period near 2005, when underestimation of suicide due to the matters discussed in (AIHW: Harrison & Henley, 2015) was at its greatest (Figure 5.4).

Members of the oldest two cohorts shown in figures 5.3 and 5.4 reached relevant ages (that is, 10–14 years and older) during the latter part of the epidemic of barbiturate poisoning mortality shown most clearly in Figure 5.1 and Figure C1.4 (Appendix C). Figure C1.4 shows suicide by *Exposure to poisons (except gas)* since 1921 to 2010 by birth cohort, as published in a previous report (AIHW: Harrison & Henley 2014).

Cohort-specific rates for this cause of death were generally trending upwards at the end of the series. The main pharmaceutical substances responsible for this increase include opioids (other than opium and heroin), benzodiazepines, antidepressants and paracetamol. Information on the types of substances recorded on death certificates in cases of suicide is provided in the next section.

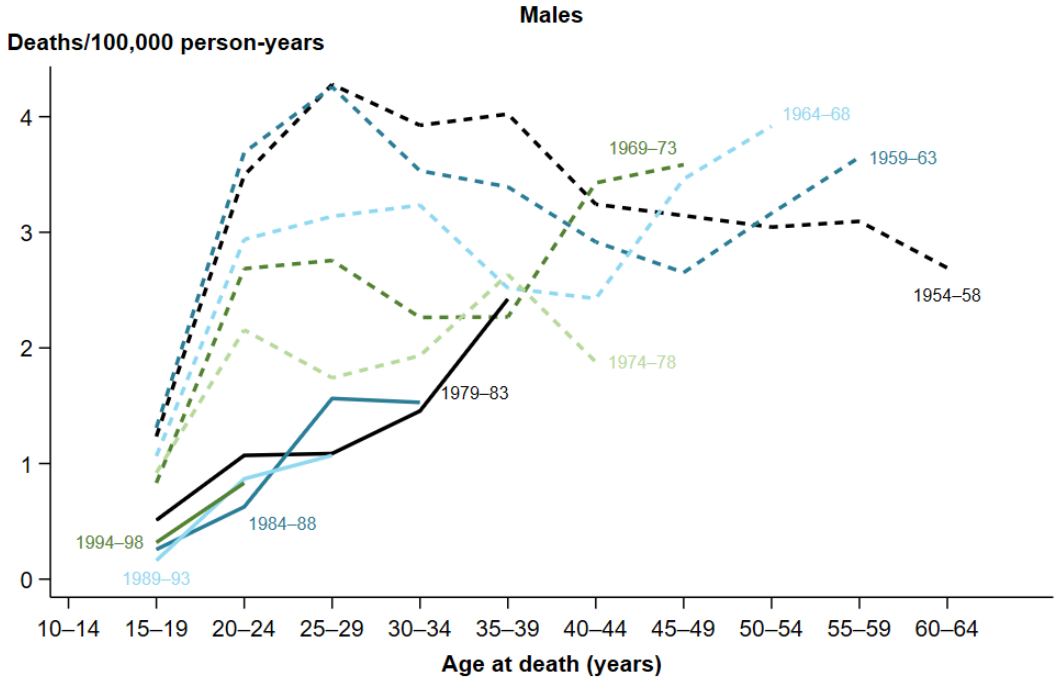
Figure 5.2: Male and female suicide rates by exposure to poisoning (except gas), by age group, Australia, 1964 to 2018

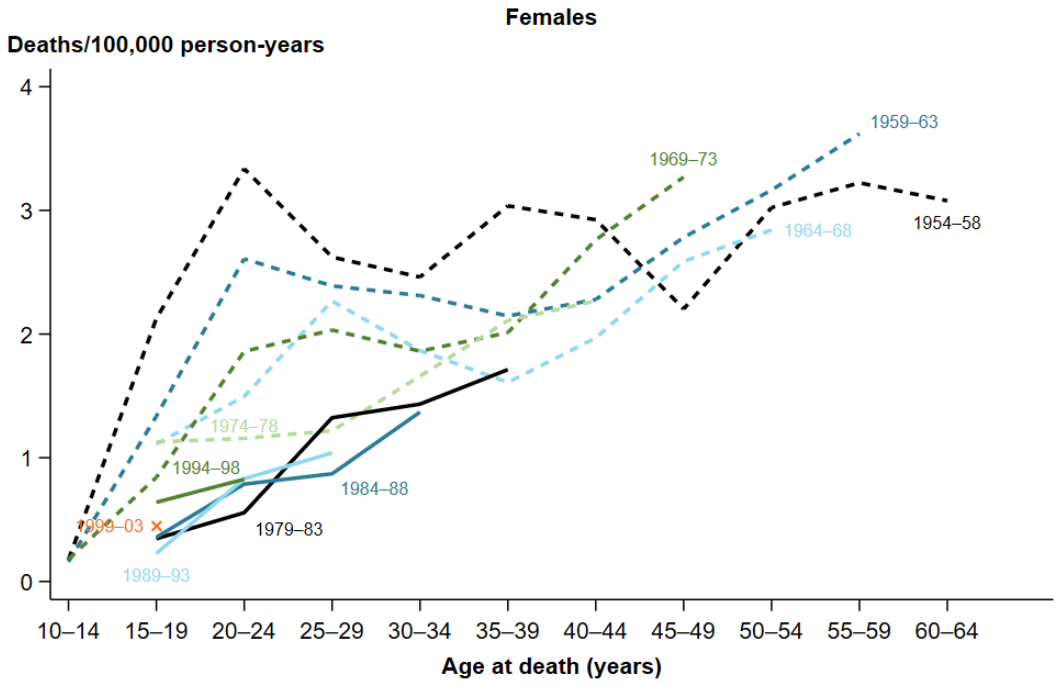


Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S5.2.

Source: AIHW National Mortality Database.

Figure 5.3: Male and female rates of suicide by poisons (except gas), by period of birth and age at death, Australia, 1964 to 2018



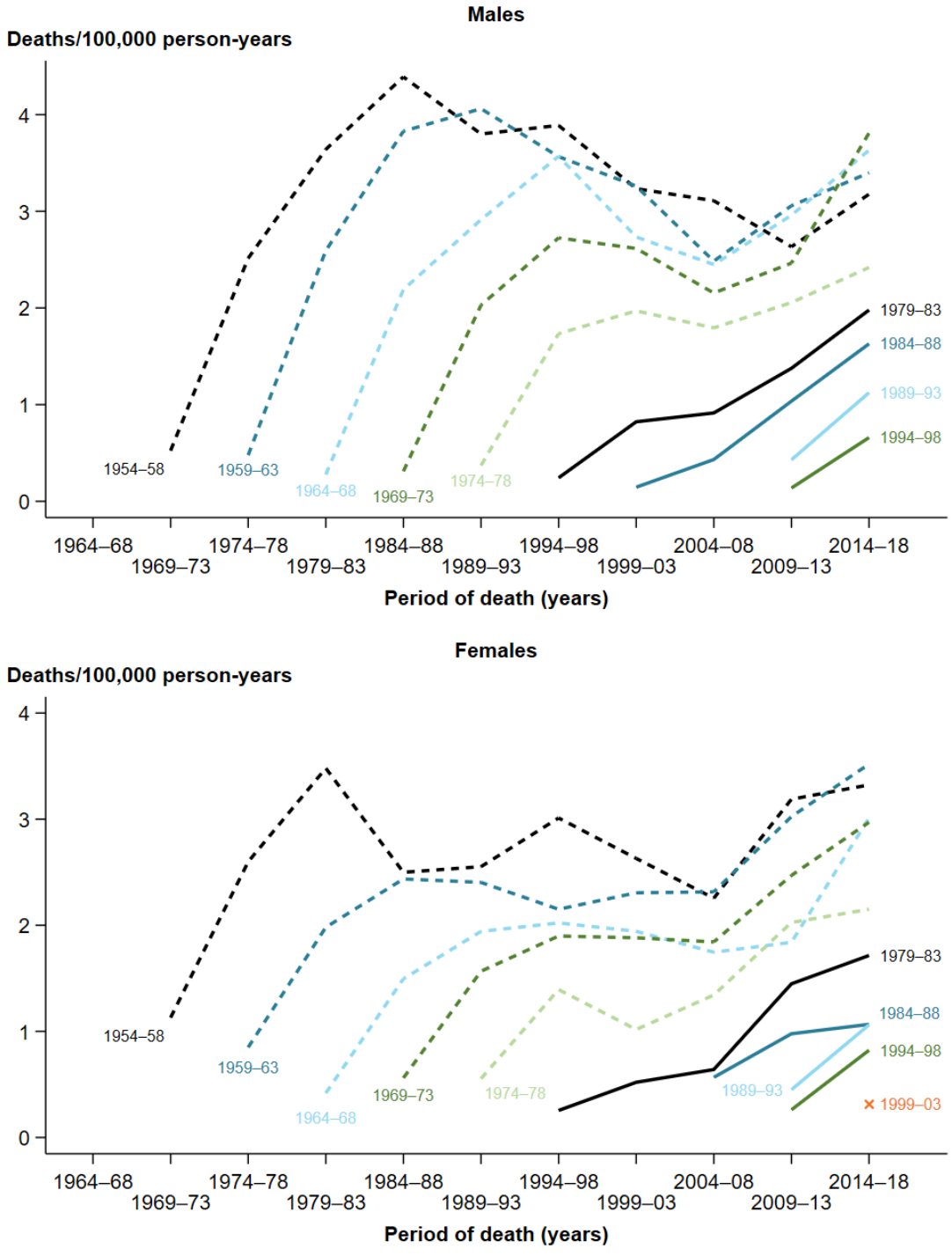


Notes:

1. Rates for some younger cohorts are not shown due to low case numbers.
2. Data underpinning this figure are available in the supplementary table spreadsheet Table S5.3.

Source: AIHW National Mortality Database.

Figure 5.4: Male and female rates of suicide by poisons (except gas), by period of birth and period of death, Australia, 1964 to 2018



Notes:

1. Rates for some younger cohorts are not shown due to low case numbers.
2. Data underpinning this figure are available in the supplementary table spreadsheet Table S5.4.

Source: AIHW National Mortality Database.

Types of pharmaceuticals

Deaths data in the NMD are derived from information on death certificates. It is common in drug-related suicide deaths for more than 1 pharmaceutical agent to be mentioned. A total of 14,462 drug-related MCoD codes for pharmaceutical agents were assigned to 7,190 deaths due to intentional poisoning involving pharmaceuticals in the period from 1997 to 2018 (Table 5.1). The most common types of pharmaceuticals used by males were benzodiazepines (19%), opioids (18%) and antidepressants (18%). Equivalent values for females were 18%, 15% and 21%.

Table 5.1: Pharmaceutical substances mentioned in NHMD records of suicide due to intentional poisoning by pharmaceuticals, by type of substance, by sex, Australia, 1997 to 2018

	Males (3,653 deaths)		Females (3,537 deaths)	
Type of substance	**No. of MCoDs**	**%**	**No. of MCoDs**	**%**
Heroin	184	2.7	68	0.9
Methadone	143	2.1	84	1.1
Other opioids	925	13.4	966	12.8
Other synthetic narcotics	220	3.2	226	3.0
Other and unspecified narcotics	138	2.0	93	1.2
Anaesthetics	23	0.3	19	0.3
Tricyclic and tetracyclic antidepressants	592	8.6	724	9.6
Other antidepressants	620	9.0	882	11.7
Barbiturates	239	3.5	200	2.7
Paracetamol	362	5.2	536	7.1
Antipsychotics and neuroleptics	360	5.2	447	5.9
Antiepileptic, antiparkinsonism drugs	273	3.9	347	4.6
Psychostimulants	133	1.9	81	1.1
Benzodiazepines	1,292	18.7	1,365	18.1
Insulin	137	2.0	132	1.7
Other and unspecified	1,274	18.4	1,377	18.2
Total MCoDs in the range T36 to T50	**6,915**	**100.0**	**7,547**	**100.0**

Note: Includes only deaths with an UCoD code indicating intentional poisoning by pharmaceuticals (X60–X64).

Source: AIHW National Mortality Database.

Of the 7,190 deaths due to intentional poisoning involving pharmaceuticals, 3,569 (50%) had more than 1 code for drugs. In addition to the external cause codes X60–X64, more specific information on the type of drug involved in a death can be found among MCoDs using the *Poisoning by drugs, medicaments and biological substances* (T36–T50) category of the ICD-10.

In these deaths, 1 code was selected for presentation by following a priority list that is part of the instructions for use of ICD-10 (www.who.int/classifications/icd/icdonlineversions/en/). The 7,190 deaths are presented in Table 5.2 according to the sole cause code for drugs (if only 1 is present in the record), or according to the type of drug with the highest priority according to the ICD-10 priority list.

Opioids (heroin, methadone and other opioids), accounted for 2,258 deaths (31%), with antidepressants accounting for another 1,367 deaths (19%). Similar proportions of male (32%) and female (31%) deaths involved opioids, while antidepressants accounted for 17% and 21% of male and female deaths, respectively.

Despite accounting for 537 deaths in Table 5.2, benzodiazepines were mentioned as an additional drug in 2,120 of the 3,569 deaths in which more than 1 drug was coded. Overall, 37% of the 7,190 deaths included a code for benzodiazepines. Similarly, despite accounting for only 252 deaths in Table 5.2, paracetamol was mentioned as an additional drug in 646 of the 3,569 deaths in which more than 1 drug was coded.

Alcohol was mentioned along with drugs in 15% of deaths (males 17%, females 13%).

Table 5.2: Suicides due to poisoning by pharmaceuticals, by type of drug, by sex, Australia, 1997 to 2018

	Males		Females	
Type of drug	**Cases**	**%**	**Cases**	**%**
Heroin	184	5.0	68	1.9
Methadone	134	3.7	82	2.3
Other opioids	861	23.6	929	26.3
Other synthetic narcotics	123	3.4	144	4.1
Other and unspecified narcotics	102	2.8	77	2.2
Anaesthetics	16	0.4	13	0.4
Tricyclic and tetracyclic antidepressants	424	11.6	487	13.8
Other antidepressants	214	5.9	242	6.8
Barbiturates	213	5.8	166	4.7
Paracetamol	90	2.5	162	4.6
Antipsychotics and neuroleptics	197	5.4	194	5.5
Antiepileptic, antiparkinsonism drugs	108	3.0	102	2.9
Psychostimulants	37	1.0	19	0.5
Benzodiazepines	293	8.0	244	6.9
Insulin	108	3.0	89	2.5
Other and unspecified	549	15.0	519	14.7
Total MCoDs in the range T36 to T50	**3,653**	**100.0**	**3,537**	**100.0**

Note: Includes only deaths with an UCoD code indicating intentional poisoning by pharmaceuticals (X60–X64).

Source: AIHW National Mortality Database.

Other suicides involving poisoning by pharmaceuticals

Another 1,253 suicide in the period 1997 to 2018 had one or more MCoD codes for poisoning by pharmaceuticals, but the UCoD code attributes suicide to a different mechanism. Of these deaths, 601 (48%) had an UCoD indicating *Intentional self-harm by hanging, strangulation and suffocation*, 239 (19%) had an UCoD indicating *Intentional self-poisoning by and exposure to other gases and vapours* and 146 (12%) had an UCoD indicating *Intentional self-harm by drowning and submersion*.

Of these 1,253 deaths, 240 (19%) had a MCoD code for some form of opioid, 179 (14%) had a MCoD for some form of antidepressant and 156 (12%) had a MCoD code for benzodiazepines.

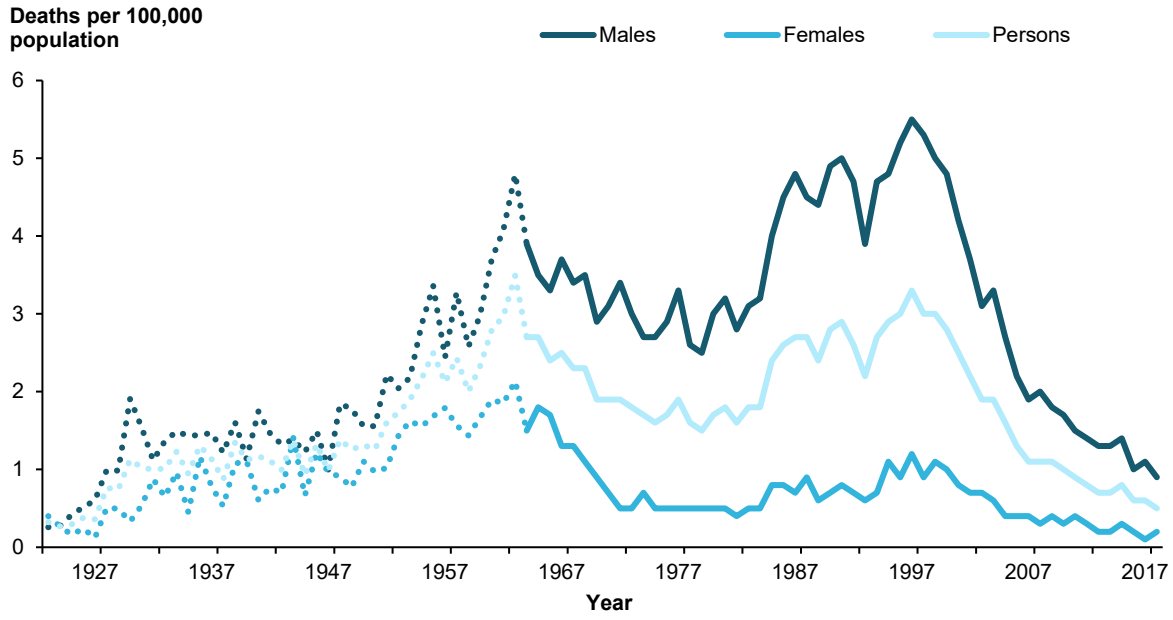
6 Trends in suicide by gas

Age-adjusted rates for male suicides due to poisoning by exposure to gas varied markedly over the period from 1923 to 2018 (Figure 6.1). Rates rose substantially between about 1950 and the early 1960s before dipping. Rates remained elevated for much of the 1980s and 1990s and then declined markedly towards the end of the period ending in 2018 (Figure 6.1). A similar pattern was present for females, although generally with lower rates.

The changes in rates over time due to this mechanism of suicide were discussed in a previous report (AIHW: Harrison & Henley 2014). The last part of this chapter considers the sources and types of gas involved these cases in the period from 1979.

Suicide by poisoning by gas is predominantly due to exposure to toxic levels of carbon monoxide (CO). Poisoning suicides by gas until the late 1960s were commonly due to exposure to CO from gas-fuelled domestic cooking and heating appliances, especially female cases. The appliances were usually fuelled by 'manufactured gas' derived from coal and toxic because of the high CO content. By the 1970s, after a generally rapid transition, this fuel had largely been replaced by 'natural gas' (mainly methane) and liquefied petroleum gas (LPG; propane and butane), neither of which contains significant amounts of CO. Suicide deaths by means of gases in domestic use were uncommon from the late 1980s.

Figure 6.1: Suicide rates by exposure to gas, by sex, Australia, 1922 to 2018



Notes:

1. Rates for 1922 to 1963 are by year of registration (dotted line) and rates for 1964 to 2018 are by year of death (solid line).
2. Data underpinning this figure are available in the supplementary table spreadsheet Table S6.1.
3. Deaths from all causes of Australian service personnel while overseas during World War 2 were not included in Australian deaths data. However, population estimates for the period do not allow for their absence, so the charted rates are underestimates, especially for males.

Source: AIHW National Mortality Database.

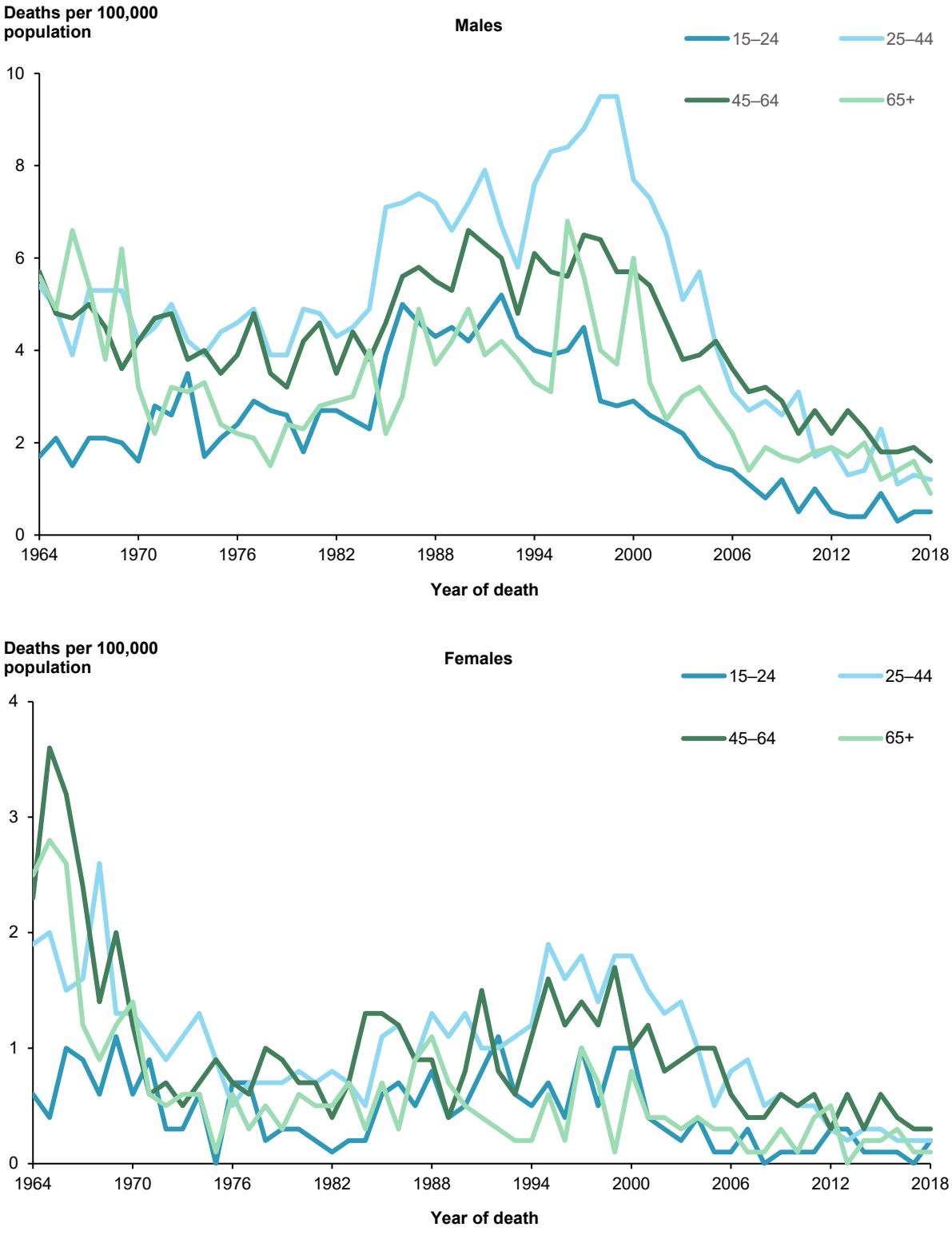
While cases (mainly male) occurred earlier, from the 1970s, motor vehicle exhaust gas was the main source of CO exposure in cases of suicide by gas. The exhaust gas of petrol engines contains potentially toxic levels of CO, which can be reduced by various technologies. Emission control requirements, introduced in 1986 (for environmental reasons) and tightened several times since, have greatly reduced the allowed content of CO in exhaust gas of new vehicles. These changes may explain the marked decline in rates of suicide by gas in Australia since the late 1990s, though exactly how this came about is not well established. The long average life-span of motor vehicles in Australia (over a decade) and differences in the average age of vehicles owned by various segments of the population (e.g. poorer people are likely to own older vehicles) complicate analysis of changes over time in exposure to this risk factor.

Trends by age group and sex

Broadly similar patterns in rates were observed for male suicides due to poisoning by gas for all 4 age groups depicted in Figure 6.2 over the period from 1964 to 2018. Rates were highest in all 4 age groups during the mid-1980s through to the late 1990s and declined markedly towards the end of the period. Rates for males aged 15–24 were markedly lower than rates for the other 3 age groups at the beginning of the period of interest.

Rates for females aged 25–44, 45–64 and 65 and over fell markedly in the early part of the period as ‘manufactured’ domestic gas was replaced by less toxic fuels. Rates for all 3 of these age groups were elevated between the mid-1980s and late 1990s and declined towards the end of the period. As with males, rates for females aged 15–24 were much lower than rates for the 3 oldest age groups at the start of the period, higher between the mid-1980s and late 1990s and low by the end of the period charted.

Figure 6.2: Male and female suicide rates by exposure to gas, by age group, Australia, 1964 to 2018



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S6.2.

Source: AIHW National Mortality Database.

Trends by birth cohort

Cohort-specific rates of suicide by exposure to gas are shown in Figure 6.3 arranged by age at death and in Figure 6.4 by period of death.

This mechanism was much more prominent for the earliest-born 4 cohorts charted than it is for the several most recently-born cohorts (Figure 6.3).

Arranging the cohort-specific data by period of death reveals strong signs of a period effect. All of the cohorts with a substantial rate of suicide due to this mechanism in the period 1994-98 showed a sharp and essentially simultaneous decline over the following 2 decades (Figure 6.4). For each cohort, this was a sharp reversal of trend, after a period in which rates had risen with age.

The period effect is particularly striking for the 4 male cohorts with the highest rates of suicide by exposure to gas (that is, those born from 1954 to 1973). Rates for all 4 of these cohorts peaked at 8 deaths per 100,000 population per year or higher in the period 1994-98, dropped to about 4 deaths per 100,000 per year over the following decade, then continued to decline. The next 2 cohorts showed progressively lower peaks in suicide from this cause. Rates for the 3 youngest cohorts charted have been low so far.

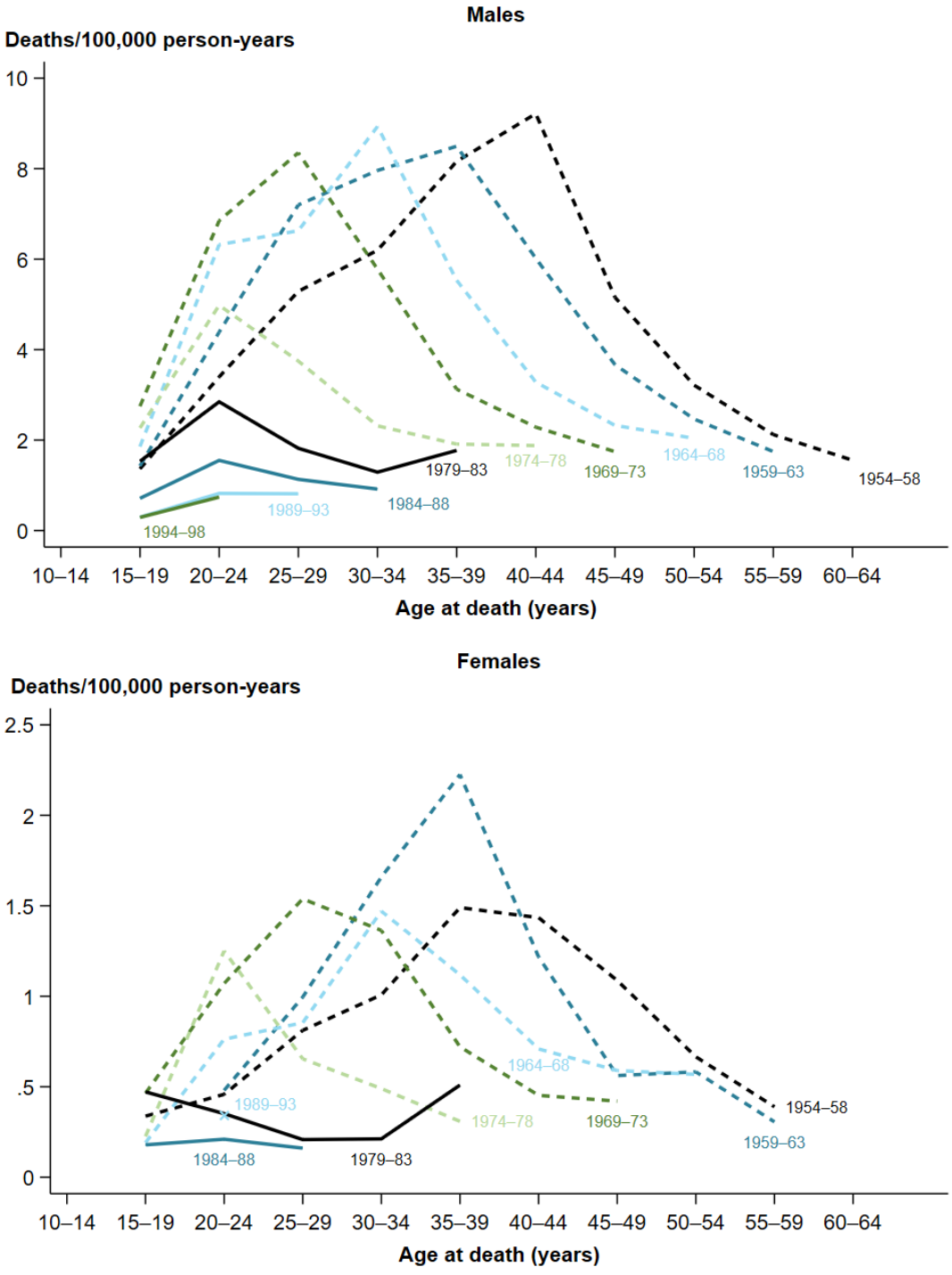
Regardless of when a person was born, suicide by exposure to gas declined sharply from the late 1990s, most likely due to reducing CO content of motor vehicle exhaust gas.

Figure C1.5 (Appendix C) shows a birth cohort analysis based on gas suicide deaths over a longer period (1921 to 2010) as published in a previous report (AIHW: Harrison & Henley 2014). As with Figure 6.4, cohort-specific lines are aligned in terms of period of death. The period of birth for each cohort is defined in Table C1.1.

In addition to the peak in the 1990s (predominantly males; largely due to motor vehicle exhaust gas and discussed above), Figure C1.5 shows an earlier peak in mortality from this cause, also visible in Figure 6.1. As discussed above, many cases in the earlier period involved gas in domestic use for cooking and heating, which generally had a high CO content in Australia until the 1960s. Figure C1.5 provides evidence for a period effect: the cohorts that had the highest rates from this cause at the end of the period in which CO-rich manufactured gas was in widespread use changed from upward to downward trends at the time that coincides with the transition to low CO domestic gas in much of Australia.

Further information on trends in cases involving domestic gas and motor vehicle exhaust gas can be found in section 7.3 of the previous report (AIHW: Harrison & Henley 2014).

Figure 6.3: Male and female rates of suicide by gas, by period of birth and age at death, Australia, 1964 to 2018

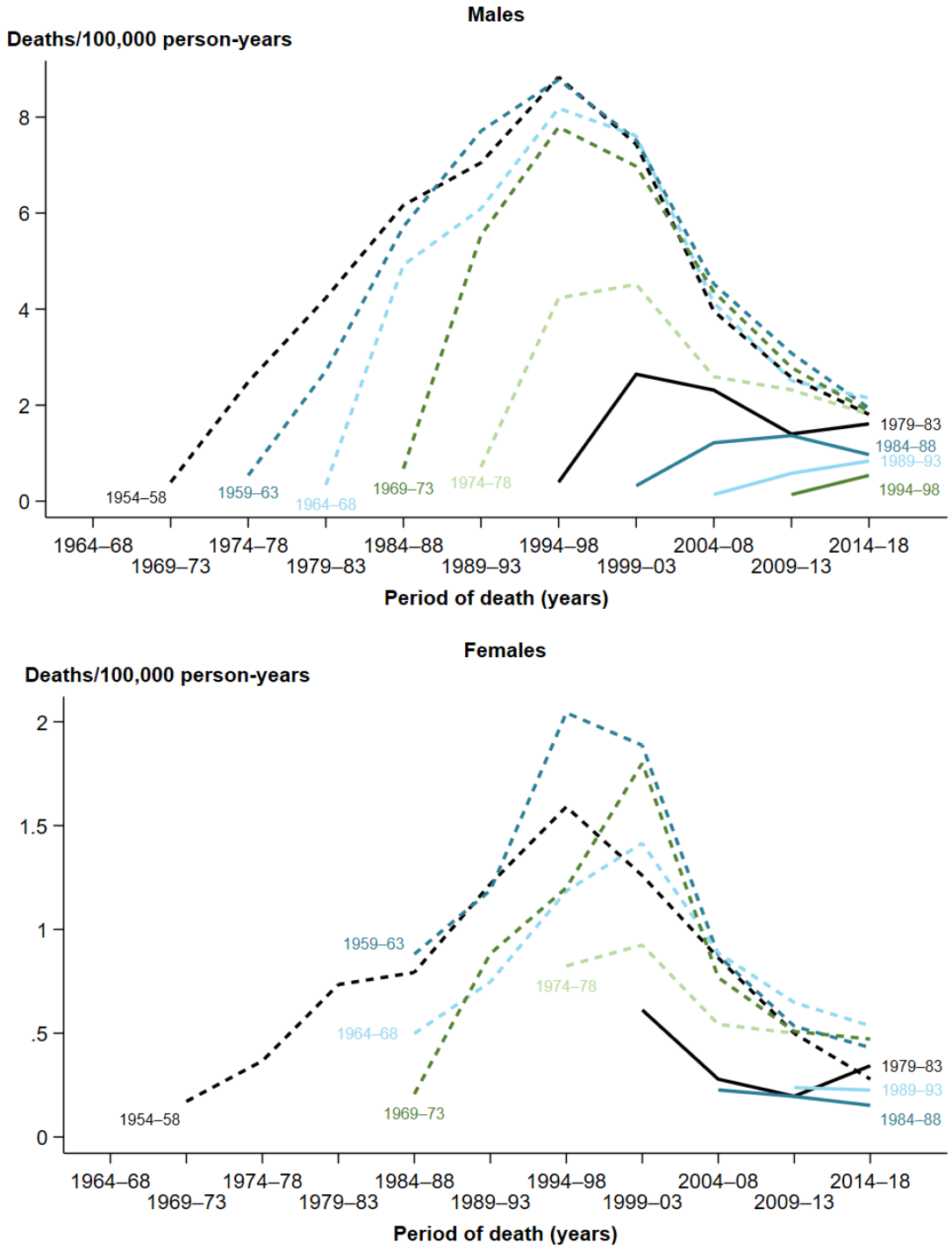


Notes:

1. Rates for some younger cohorts are not shown due to low case numbers.
2. Data underpinning this figure are available in the supplementary table spreadsheet Table S6.3.

Source: AIHW National Mortality Database.

Figure 6.4: Male and female rates of suicide by gas, by period of birth and period of death, Australia, 1964 to 2018



Notes:

1. Rates for some younger cohorts are not shown due to low case numbers.
2. Data underpinning this figure are available in the supplementary table spreadsheet Table S6.4.

Source: AIHW National Mortality Database.

Source and type of gas

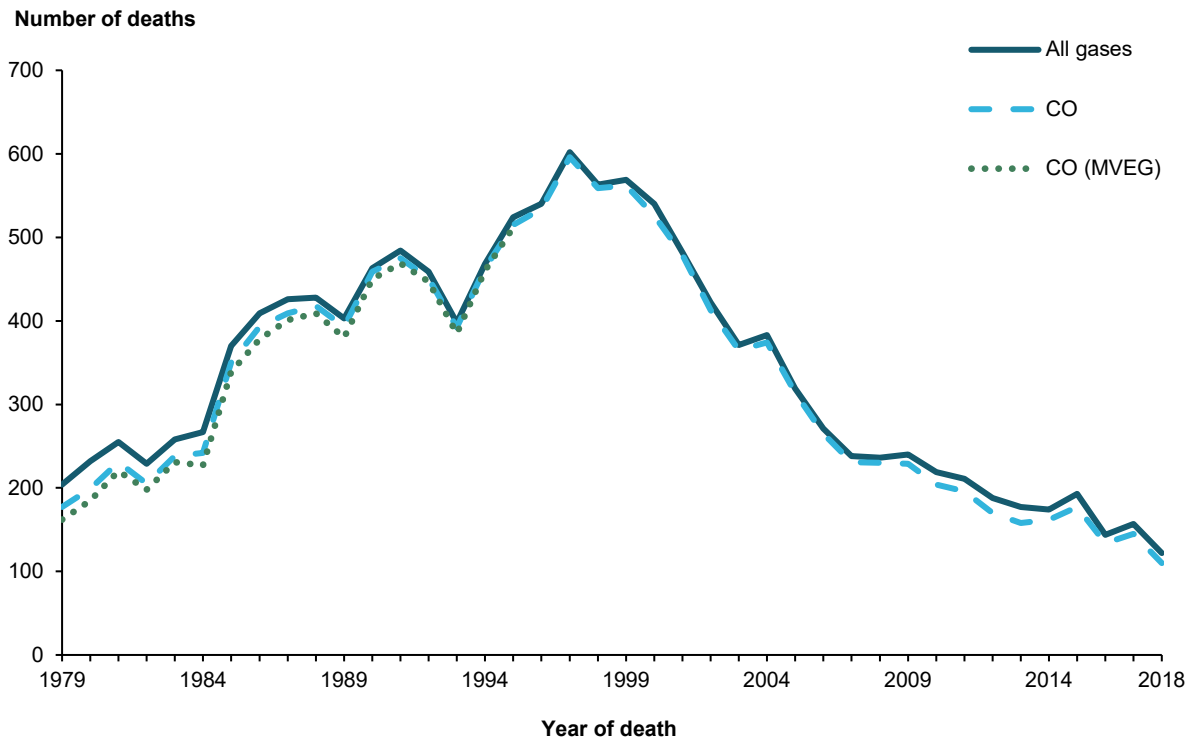
The most recent 2 revisions of the ICD provide more relevant categories than earlier revisions for assessing the source and type of the gas in cases of suicide by gas. They are the 9th revision (introduced for deaths registered in 1979) and the 10th (formally from 1999 but also applied to the 2 years before that).

The solid line in Figure 6.5 shows the number of suicides by exposure to any poisonous gas that were registered from 1979 onwards.

For the period in which ICD-9 was used to code deaths in Australia, the chart shows two subtypes: cases coded as carbon monoxide poisoning (CO; blue dashed line) and cases coded as poisoning by motor vehicle exhaust gas (CO (MVEG); dotted line). The great majority of suicide by gas cases were coded as being due to CO and nearly all of those involved MVEG.

ICD-10 does not provide a specific category for suicided by exposure to MVEG, but multiple cause coding of the data in this period allows identification of suicide by gas cases that were due to toxic effect of CO (blue dashed line). Based on data from the ICD-9 period, it is reasonable to assume that most suicides due to poisoning by CO in the period of ICD-10 coding were due to MVEG.

Figure 6.5: Number of suicides by exposure to gas for all gases, carbon monoxide and carbon monoxide from motor vehicle exhaust gas (MVEG), Australia, 1979 to 2018



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S6.5.

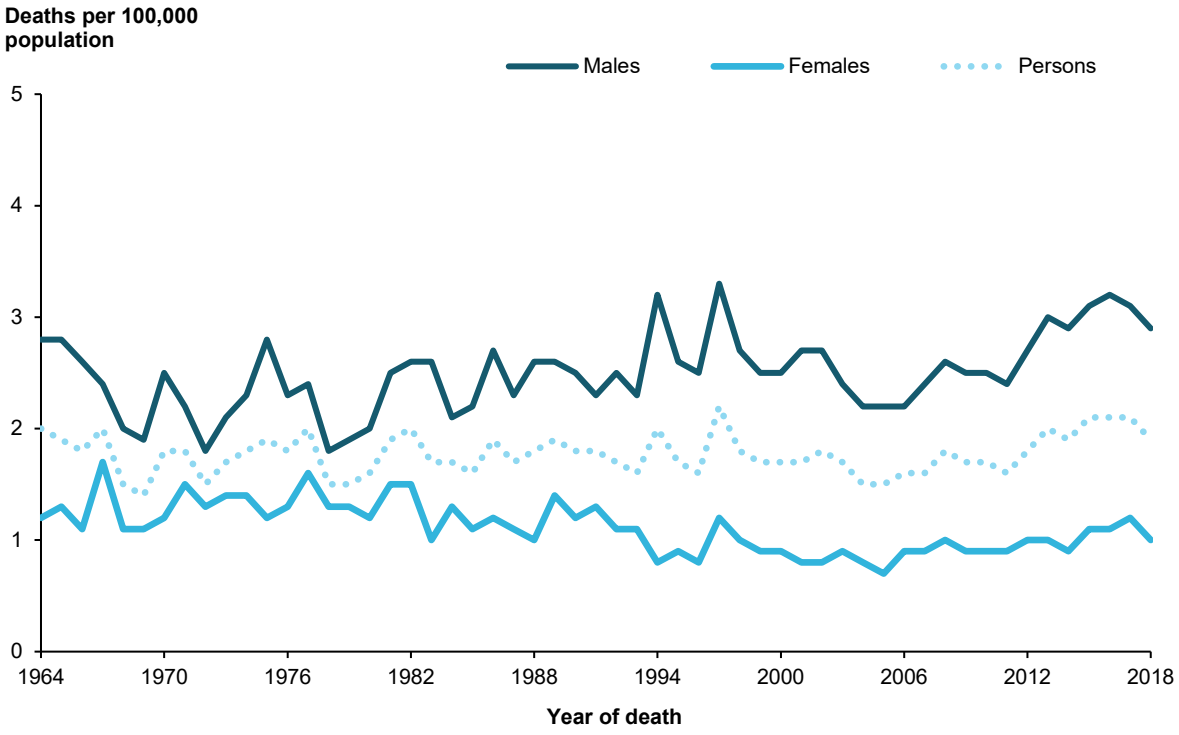
Source: AIHW National Mortality Database.

7 Trends in suicide by other mechanisms

This section reports briefly on trends of suicide by mechanisms other than hanging, shooting, and poisoning by gas or by other substances. All other mechanisms combined accounted for from 9% to 18% of male suicide deaths each year from 1964 to 2018, and from 9% to 27% of female cases.

Age-adjusted rates for male suicides due to suicide by other mechanisms rose slightly between 1964 and 2018, with marked fluctuations from year to year (Figure 7.1). Rates for female suicides due to other mechanisms of injury decreased slightly over the period.

Figure 7.1: Suicide rates by other mechanisms, by sex, Australia, 1964 to 2018



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S7.1.

Source: AIHW National Mortality Database.

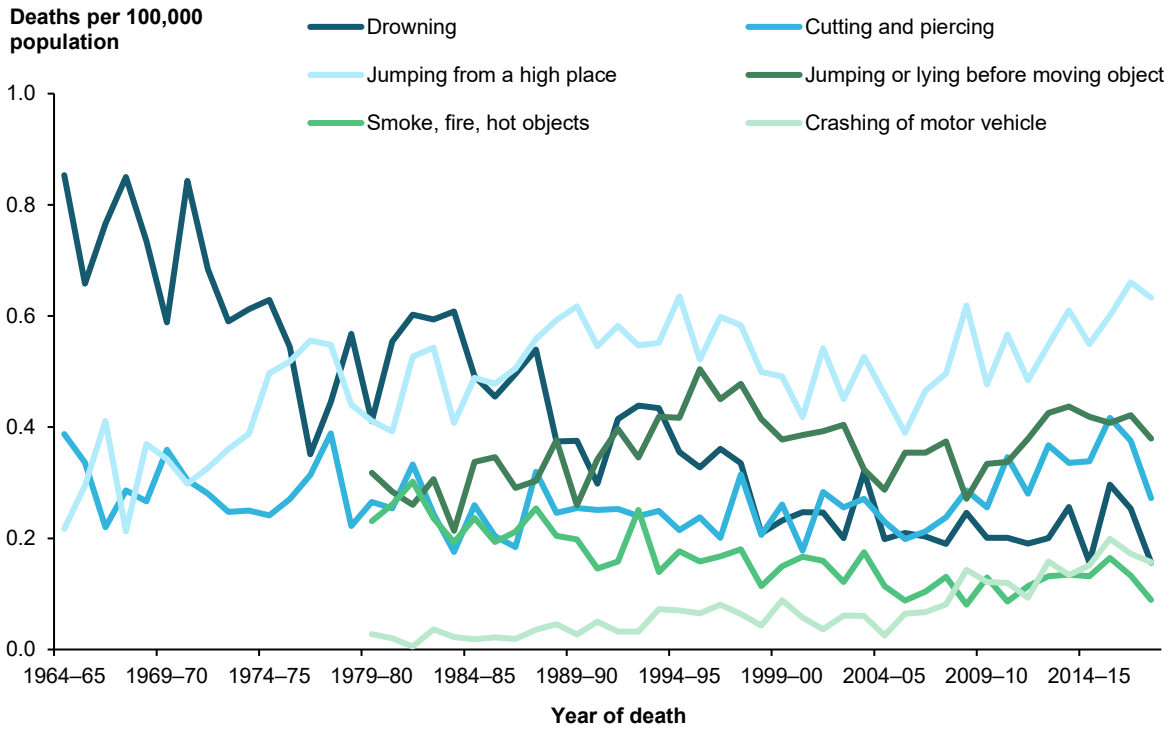
Trends by mechanism

Figure 7.2 shows age-adjusted suicide rates for 6 mechanisms included as other mechanisms from 1964–65 to 2017–18. Specific ICD categories for mechanisms involving jumping or lying before moving object; exposure to smoke fire and hot objects; and crashing of motor vehicle did not exist prior to the introduction of the 9th revision of the ICD, which was first applied to Australian deaths data registered in 1979.

There was a downward trend in rates of suicide due to drowning over this period. Rates for suicide due to contact with a sharp object were relatively steady while rates for suicide due to jumping from a high place were relatively steady from the mid-1970s, after a rise early in the period charted.

Rates of suicide involving crashing of a motor vehicle rose over the period from 1979–80 (though still at a low level), while rates for suicides involving exposure to smoke, fire, flames and hot objects tended to decrease. Rates of suicide due to jumping or lying before a moving object fluctuated, being relatively high in the mid-1990s before declining and then rising again towards the end of the period.

Figure 7.2: Suicide rates for deaths due to selected mechanisms by sex, Australia, 1964–65 to 2017–2018



Note: Data underpinning this figure are available in the supplementary table spreadsheet Table S7.1.

Source: AIHW National Mortality Database.

Appendix A: Data issues

Data sources

Deaths data are provided to the AIHW by the Registries of Births, Deaths and Marriages and the National Coronial Information System and coded by the ABS. The data are maintained by the AIHW in the National Mortality Database (NMD). Data on deaths registered in the period from 1 January 1964 to 31 December 2018 are from the unit record NMD.

Death registrations for the period from 1 January1921 to 31 December 1963 are as published by the Commonwealth Bureau of Census and Statistics in the Demography Bulletins series to 1962 and then in the Causes of Death series. Values are from tables of numbers of deaths by year of registration, cause, sex, and 5-year age groups to 85 years and older. The tables used here were prepared by the AIHW and were used for previous projects including (AIHW: Harrison & Henley 2014). Historical data on causes of death are held by the AIHW in spread-sheets as part of the content of the AIHW General Record of Incidence of Mortality.

Selection criteria

The report is intended to describe the population incidence of injuries in Australia that resulted in death due to suicide. This section describes the criteria that were used to select records to achieve this purpose.

Period

Unit record deaths data used for this report covers the period from 1964 to 2018. Four revisions of the ICD were used in this period, ICD-7 to ICD-10. Table A1.1 shows the years of death registration for which each revision of ICD was in use, and the codes that indicate suicide (or intentional self-harm). Records with these codes as the *Underlying cause of death* (UCoD) were included in this report. Deaths recorded as being due to late effects of self-harm were omitted where coding enabled that to be done (see below). Deaths coded as having undetermined intent were not included.

Table A1.1: ICD revisions used in Australia, by years of registration and code ranges

Revision[(a)]	Years of registration	Code range (Suicide)
ICD-7	1958–1967	E970–E979
ICD-8	1968–1978	E950–E958
ICD-9	1979–1998[(b)]	E950–E958
ICD-10	1999–2018	X60–X84

(a) International Classification of Diseases, Injuries and Causes of Death (ICD).

(b) Deaths registered in 1997 and 1998 were also coded to ICD-10.

Injury

Cases were included if the *Underlying cause of death* (UCoD) was assigned an International Classification of Disease (ICD) code indicating suicide (Table A1.1). Deaths attributed to late effects of self-harm were excluded where that was could be done. This is because the focus of the report is cases of self-harm incident in a period, but the date of injury for late effects

cases is unknown and could be long before death. The number of deaths coded as due to late effects of suicide is small: an average of about one death per year from 1964 onwards. Late effects cases were not omitted from the tabular data used for deaths registered from 1954 to 1963. However, according to Demography Bulletins for the period only one death was coded to this cause in the years 1951 to 1962, inclusive.

NCIS data

In some instances, rates for deaths due to suicides calculated using NMD mortality data were compared with rates calculated using data extracted online from the NCIS, at <www.ncis.org.au>, as at April 2020. Data were downloaded from the NCIS website, and duplicate records (that is, records with matching NCIS numbers) were removed before analysis. Table A1.2 provides the criteria for selecting suicide deaths.

Table A1.2: Inclusion and exclusion criteria for suicide cases extracted from the NCIS website

Criteria for inclusion	Criteria for exclusion
(Case type[(a)] notification or case type completion = Death due to external cause(s)	Case type at completion = Death due to natural cause(s)
and	**or**
Intent notification or intent completion = Intentional self-harm)	Intent completion = Unintentional, Assault, Legal intervention, Operations of war, civil conflict and acts of terrorism, or Complications of medical or surgical care.
or	
Activity code level 2 = Self-inflicted harm.	

(a) Case type indicates whether a death was due to natural, external, or unknown causes, or the body was never recovered.

Changes in how suicide data were obtained and processed

Noteworthy changes occurred during the first decade of the twentieth century in how suicide data were obtained and processed in Australia. Deaths by suicide are certified by coroners. Until 2003, ABS officers obtained the information used to cause-code coroner-certified deaths from records in coroners' offices. In 2003 they began to use the on-line National Coronial Information System (NCIS) to access information and have relied solely on the NCIS for coroner-certified deaths registered from 2006 onwards. This change had effects on the coding of causes of injury deaths, particularly on the ascertainment of the role of human intent.

Further changes were introduced by the ABS, largely as a consequence of this. The main further changes were (i) the introduction of a program of data revisions (see below); (ii) a change in the use of the 'undetermined intent' block of the ICD-10 External Causes chapter; and (iii) application of more resources to the investigation of coroners' reports to identify specific causes of death, through increased use of police reports, toxicology reports, autopsy reports and coroners findings. The changes were first applied to deaths registered in 2007. Enhancements were made for processing deaths registered in 2008 and later. Deaths registered in 2006 were re-processed according to the revised methods and the revised file was released in 2012. Further information on the changes and their effects on suicide statistics can be found in a previous report (Harrison et al. 2009). These matters are also a subject of a technical report on injury mortality statistics (AIHW: Harrison & Henley 2015).

A guide to the changes and their effects concerning suicide statistics has been provided by the ABS as part of the on-line report on Causes of Death, Australia, 2012 <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/3303.0main+features100042012>.

Data revisions

The Australian Bureau of Statistics (ABS) introduced a process whereby all coroner-certified deaths registered after 1 January 2007 are subject to 2 rounds of revision, occurring at 12 and 24 months after the initial release of data. In each revision, coroner cases that were open at the previous ABS processing end date are reassessed by the ABS to take account of any new information available on the National Coronial Information System (NCIS). The ABS refers to the first release of data for each reference year as *Preliminary* and the subsequent releases as *Revised* and *Final*.

This report is based on data from the mortality data unit record collection that includes the first and only release for reference years 1964 to 2005, the updated release for 2006, the *Final* release for reference years 2007 to 2015, the *Revised* release for the 2016 reference year and the *Preliminary* release for the 2017 and 2018 reference years.

Multiple causes of death

Until the end of 1996, the ABS coded only 1 cause for each death. This is the *Underlying cause of death* (UCoD) which the Bureau defines as being 'the disease or injury which initiated the train of morbid events leading directly to death', in keeping with World Health Organization (WHO) rules. The UCoD is derived from information on the death certificate according to rules that form part of the *International Classification of Diseases*.

Beginning with deaths registered in 1997, other morbid conditions, diseases and injuries entered on the death certificate were also coded as *Multiple Causes of Death* (MCoDs). Up to 20 MCoDs may be recorded for each death.

Where they are assigned, MCoD codes can provide additional information about deaths where the UCoD was an *External cause* (injury or poisoning). MCoDs also make it possible to identify an additional subset of deaths, namely those where the UCoD was not an *External cause*, but where 1 or more *External causes* have been specified on the death certificate as having contributed to the death.

In this report, cases have been included solely on the basis that they have been assigned an UCoD code indicating suicide (that is, an ICD-10 code from the *Intentional self-harm* block, X60–X84 and conceptually equivalent ranges in earlier ICD revisions). Previous investigations have found a small number of cases (3–4 cases annually on average since 1997) that are not included by this criterion in which MCoD codes are in the range X60–X84 (suicide) (Henley & Harrison 2009; Henley et al. 2007). These cases have not been included in the present report, for comparability with data for years before MCoDs became available.

For deaths registered from 1997 onwards, MCoD codes have been used with UCoD codes to determine counts related to poisoning by exposure to poisons (except gas) (T36–T57, T60–T65), or poisoning by exposure to gaseous substances (T58–T59).

Reporting periods

The AIHW receives mortality unit record data in annual files, each containing records for all deaths *registered* in a particular calendar year and notified to the ABS within three months of the end of the year, the causes being coded using information known to the ABS by a cut-off date, normally some time towards the end of the following calendar year.

Some time always passes between the date on which a death occurs and the date on which it is registered. Hence, a file containing records for all deaths *registered* during a given period (for example, during the calendar year 2018) will include the deaths that occurred in that period and had been registered by the end of the period, and will not include deaths that occurred in the period (or in an earlier period) but were registered later (i.e. after the end of 2018). Most of these are deaths that occurred in the few months before the end of the latest registration year, plus a small number of deaths that occurred earlier than that.

Adjusted estimates of suicides for 2016 to 2018

Lag

Suicide case data for the period commencing with 1964 have been presented in terms of year of death, rather than year of death registration. Most suicide deaths are registered in the calendar year in which they occurred (about 90% in recent years). Nearly all the remainder are registered in the following year or the one after that, by which time about 99.9% of the eventual total number have been registered. The data files available for this report include deaths that had occurred and been registered by the end of 2018. Information on lag in earlier years was used to estimate the number of suicide deaths that occurred in 2018 and had not been registered by the end of 2018. The basis used was to take the number of suicide deaths registerd in 2018 but occurring in the 5 previous years as an estimate of the number of suicides occurring in 2018 that will be registered in a later year. In the past 6 years estimates of total cases made in that way ranged from 99.0 to 101.9 % of the eventual value. The estimated number of suicides occurring in 2018 was 3038, comprising the 2710 suicide deaths that occurred in 2018 and had been registered by the end of 2018 plus an estimate of 328 cases yet to be registered. Suicide deaths that occurred in 2017 were used as the basis for proportional assignment of the estimated additional deaths by mechanism of suicide, sex and age at death.

Revision

Beginning with the deaths registered in 2007, the ABS has released three editions of each annual cause of death data file, named *Preliminary*, *Revised* and *Final*. The cause assigned to a small proportion of deaths changes between editions, generally because a coronial process has concluded. The UCoD codes for some deaths are changed to suicide and some are changed from suicide. From *Preliminary* to *Final*, there was an average annual net increase of 66 suicide deaths for registration years 2013 to 2015 (the most recent year for which Final version has been released).

The data files available for this report are the *Final* edition for registration years to 2015, the *Revised* edition to 2016 and the *Preliminary* edition for 2017 and 2018. We used patterns of change in numbers of suicide deaths observed for registration years 2013 to 2015 to estimate changes in suicide cases for the data files that were not yet available as *Final*. The number of suicides occurring in 2016 was adjusted upwards by 33 deaths and the number of suicides occurring in 2017 and 2018 were each adjusted upwards by 66 deaths.

Cross-tabulations of preliminary and final revisions for 2013 to 2015 registrations were used to proportionally assign the estimated additional suicides to a mechanism of suicide. Patterns of suicide deaths occurring in 2017 were used as the basis for proportional assignment of the estimated additional deaths by sex and age at death.

Data quality

The reliability of information about cause of death depends on the reliability of ICD codes provided by the ABS. This depends largely on the adequacy of the information provided to the ABS through Registrars of Births, Deaths and Marriages, and originating from coroners and medical practitioners. Little published information is available on the quality of the data resulting from this process, particularly as it applies to injury deaths. Centralisation of mortality coding in the Brisbane office of the ABS since the mid-1990s has reduced the potential for variation due to local differences in coding practice. However, factors affecting information recording, provision, or coding could affect data in different ways for different jurisdictions, periods or population groups. Hence, apparent differences should be interpreted with caution.

The data quality statements underpinning the National Mortality Database can be found in quality declaration summaries in the following ABS catalogues: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/3303.0/> <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3302.0>.

Birth cohort analysis

Rates by age at death and period of death were calculated for birth cohorts. Cohorts were organised by 5-year groups from those born in 1954–58 through to those born in 2004–2008.

As is usually necessary when using vital data, cohort-specific estimates were derived from period-specific data. Cohort-specific case numbers were derived from unit record cause-of-death data for ABS reference years 1964 and later. Where date of birth was available (nearly all deaths registered from 1997 and some in the several years before that) that was used to assign cases to a cohort. Otherwise assignment was on the basis of date of death less age in completed years at death plus 0.5 years (to allow for time between last birthday and death).

Cohort population data were derived from ABS tables of population by sex and single year of age from 1971 to 2019 and for earlier years from tables of population by sex and age in 5 year bands to 85 and older, distributions of ages within tabulated bands being derived from the nearest population census.

Deaths data and population data were organised into a form suitable for calculating rates in birth cohorts by using the procedure –poprisktime– for the Stata statistical package (Rutherford et al. 2010; StataCorp 2013). Age, period of death and period of birth were by single year in the case data input to –poprisktime–.

Two files were derived from the output, one by collapsing it to 5-year bands of cohort and age (not retaining period), and the other by collapsing it to 5-year bands of cohort and period (not retaining age). Mechanism- and sex-specific rates per 100,000 person-years population risk time were calculated, framed in terms of age at death and in terms of period of death. The pattern of rates for a cohort framed in terms of age at death is similar to the pattern of rates framed in terms of period of death, but not identical.

For comparison purposes, birth cohort analyses over a longer timeline (deaths from 1921 to 2010) were also included from a previously published report (AIHW: Henley & Harrison 2014). This material is provided in Appendix C.

Rates

Age-standardisation

Population-based rates were age-standardised except where they are stated to be age-specific. Note that the cohort-based rates were not age-adjusted.

Age adjustment allows for comparison without distortion due to differences between time periods, or between groups (such as males and females), in the proportion of people in various age groups. Direct standardisation was used to adjust rates, using the Australian population in 2001 as the standard (ABS 2003), using 5-year age groups except for an oldest age group of 85 years and older. Age-standardised rates were calculated in Stata version 16.0 statistical software using the -dstdize- command (StataCorp 2019).

Population denominators

General population

In charts or tables showing information by calendar year, rates were calculated using, as the denominator, the final estimate of the estimated resident population as at 30 June in the relevant year (for example, 30 June 2017 for calendar year 2017 cases).

Appendix B: Fatal and non-fatal episodes of self-harm

This appendix presents additional results from the work described in the section of Chapter 2 entitled *Fatal and nonfatal episodes of self-harm* (pages 6 to 9).

Table B1.1 shows comparisons between fatal and non-fatal episodes of self-harm over the period from 1994 to 2017. Notably, while almost 78% of fatal episodes involved males, only 38% of non-fatal episodes involved males.

There was a marked difference in age profiles between fatal and non-fatal episodes. Ages for fatal episodes tended to be older with 14% of these episodes occurring at ages 10–24 years and another 14% occurring at ages 65 and older. For non-fatal episodes the corresponding percentages were 32% and 4% respectively.

In 2017, the number of fatal episodes of self-harm was 48% higher than the number of fatal episodes in 1994, while the corresponding figure for non-fatal episodes was 78% higher.

Mechanisms of self-harm varied markedly between fatal and non-fatal episodes of self-harm over the period from 1994 to 2017. For fatal episodes, nearly 48% involved hanging, 14% involved poisoning by substances other than gas, 14% involved poisoning by gases and 9% involved firearms. In sharp contrast, 82% of non-fatal episodes involved poisoning by substances other than gas and 12% involved contact with a sharp object.

Table B1.1: Fatal and non-fatal episodes of self-harm, Australia, 1994 to 2017

	Fatal episodes		Non-fatal episodes	
	Count	%	Count	%
Sex				
Male	46,346	78	224,912	38.2
Female	13,442	22	364,509	61.8
Not stated	0	0.0	35	0.0
Age[(a)]				
10–24	7,528	14.3	167,247	31.6
25–44	22,049	41.8	234,986	44.4
45–64	15,697	29.8	106,038	20.0
65+	7,428	14.1	21,123	4.0
Missing/other	14	0.0	273	0.1

(continued)

Table B1.1 (continued): Fatal and non-fatal episodes of self-harm, Australia, 1994 to 2017

	Fatal episodes		Non-fatal episodes	
	Count	%	Count	%
Year				
1994	2,285	3.8	17,898	3.0
1995	2,364	4.0	20,300	3.4
1996	2,423	4.1	21,591	3.7
1997	2,647	4.4	23,224	3.9
1998	2,641	4.4	25,187	4.3
1999	2,490	4.2	22,111	3.8
2000	2,392	4.0	20,933	3.6
2001	2,471	4.1	23,021	3.9
2002	2,329	3.9	22,230	3.8
2003	2,164	3.6	22,523	3.8
2004	2,130	3.6	23,144	3.9
2005	2,096	3.5	23,914	4.1
2006	2,144	3.6	23,554	4.0
2007	2,261	3.8	23,230	3.9
2008	2,328	3.9	24,471	4.2
2009	2,361	3.9	26,521	4.5
2010	2,413	4.0	25,927	4.4
2011	2,477	4.1	25,855	4.4
2012	2,567	4.3	27,305	4.6
2013	2,655	4.4	26,477	4.5
2014	2,887	4.8	27,191	4.6
2015	3,066	5.1	28,955	4.9
2016	2,957	4.9	32,076	5.4
2017	3,240	5.4	31,818	5.4
Mechanism				
Poisons (except gas)	8,520	14.3	483,425	82.0
Gases	8,235	13.8	8,608	1.5
Hanging/ suffocation	28,609	47.9	10,940	1.9
Drowning	1,244	2.1	516	0.1
Firearms	5,336	8.9	847	0.1
Sharp object	1,426	2.4	69,822	11.8
Jumping from a height	2,701	4.5	2,793	0.5
Jumping before a moving object	1,950	3.3	1,121	0.2
Crash by motor vehicle	499	0.8	1,466	0.2
Other/ unspecified	1,268	2.1	9,918	1.7
Total	**59,788**		**589,456**	

(a) Episodes for age only shown for the period from 1997 to 2017.

Appendix C: Cohort charts 1921 to 2010

The present report analyses suicide using data on deaths registered in Australia from 1 January 1964 onwards. This is the period for which electronic unit record cause of death data are available for Australia.

A previous AIHW report on suicide includes charts covering mortality from this cause, some arranged by birth cohort, for deaths that were registered in an earlier period, commencing with deaths registered in 1921 and ending with deaths that occurred in 2010 (AIHW: Harrison & Henley 2014). This appendix includes selected figures from that report to provide context for the present report.

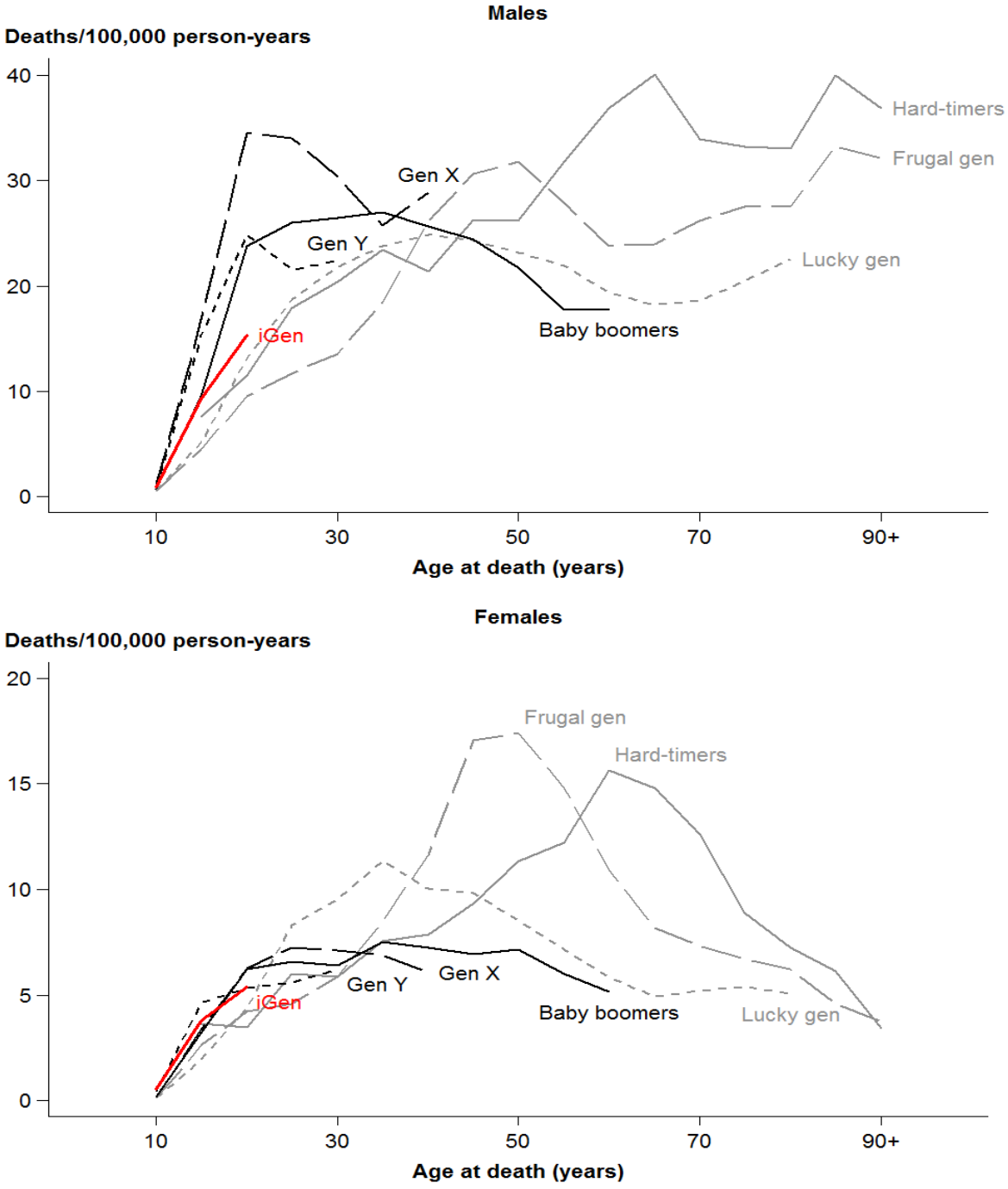
The data included in the earlier analysis were used to examine cohorts of Australians born from late in the nineteenth century onwards. In that report, cohorts were specified and named in accordance with the Statistician's Report on the 2006 Census (ABS 2009), with one exception: Gen X was reported separately from Gen Y in the AIHW report because noteworthy differences in suicide were observed between those groups. The groups' names and periods of birth are shown in Table C1.1

Table C1.1: Birth cohorts by period of birth and title

Period of birth	Title
1886 to 1905	Hard-timers
1906 to 1925	Frugal generation
1926 to 1945	Lucky generation
1946 to 1965	Baby boomers
1966 to 1975	Gen X
1976 to1985	Gen Y
1986 to 1994	iGen

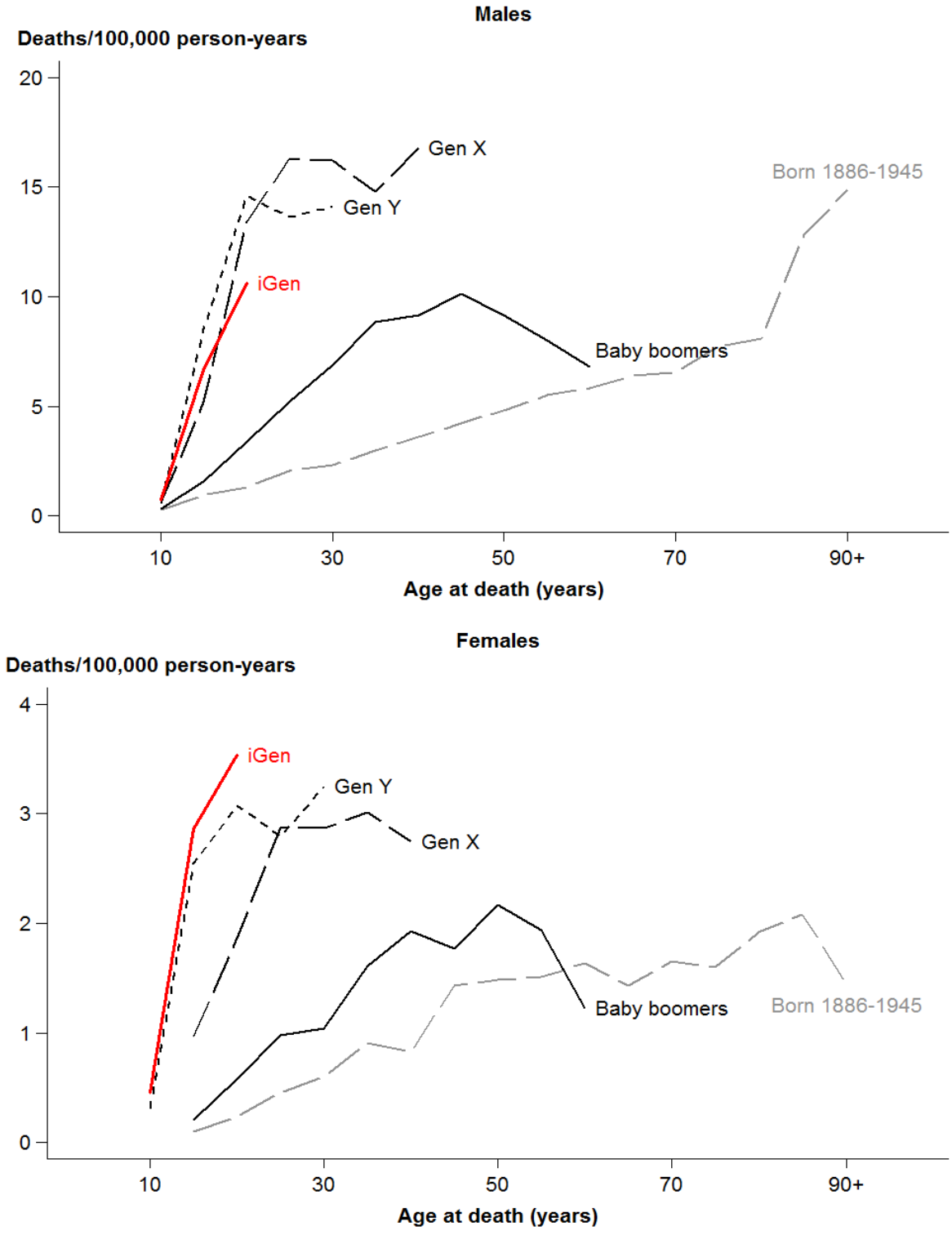
Source: (ABS 2009).

Figure C1.1: Male and female rates of suicide, by period of birth and period of death, Australia, 1921 to 2010



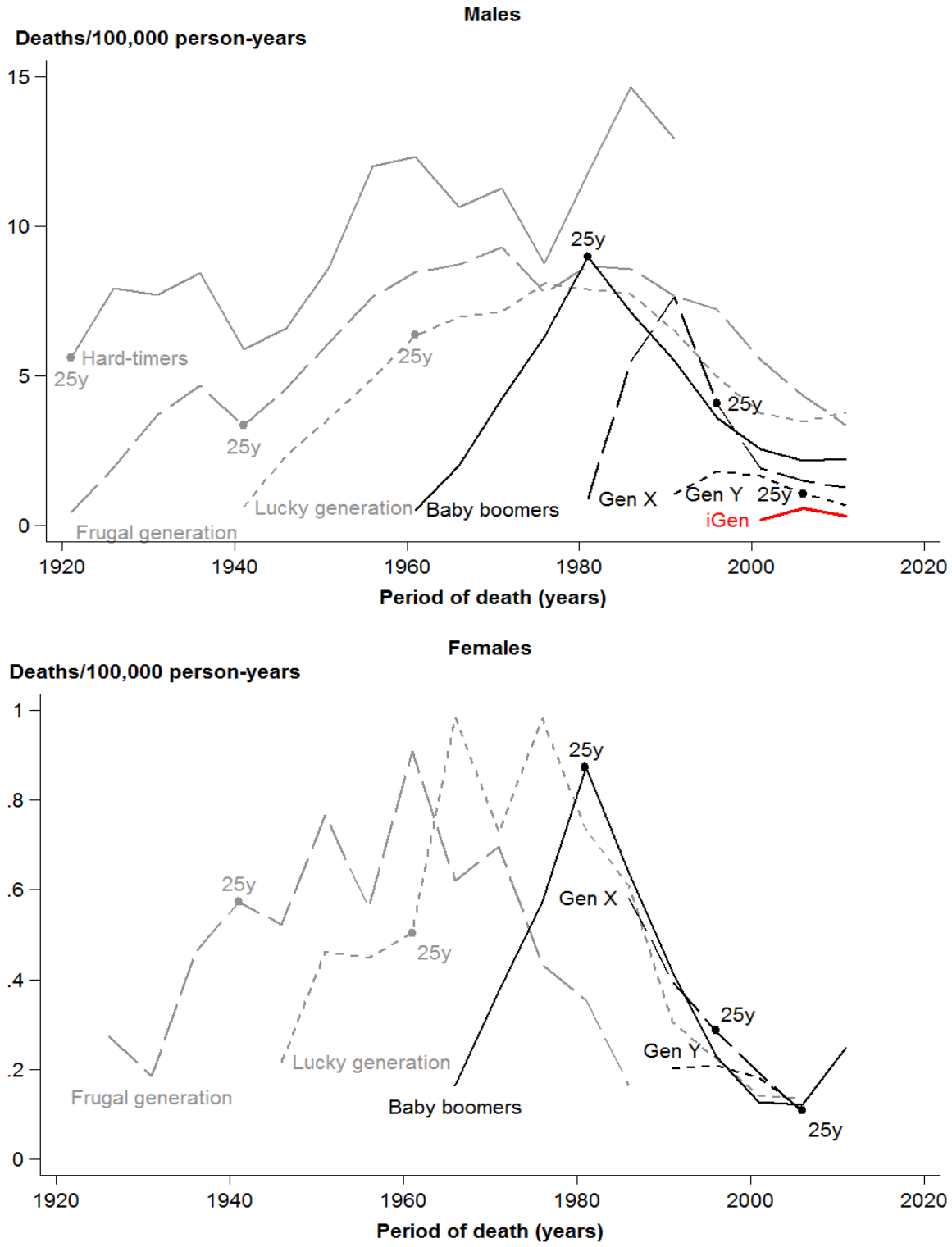
Source: AIHW: Harrison & Henley 2014.

Figure C1.2: Male and female rates of suicide by hanging, by period of birth and age at death, Australia, 1921 to 2010



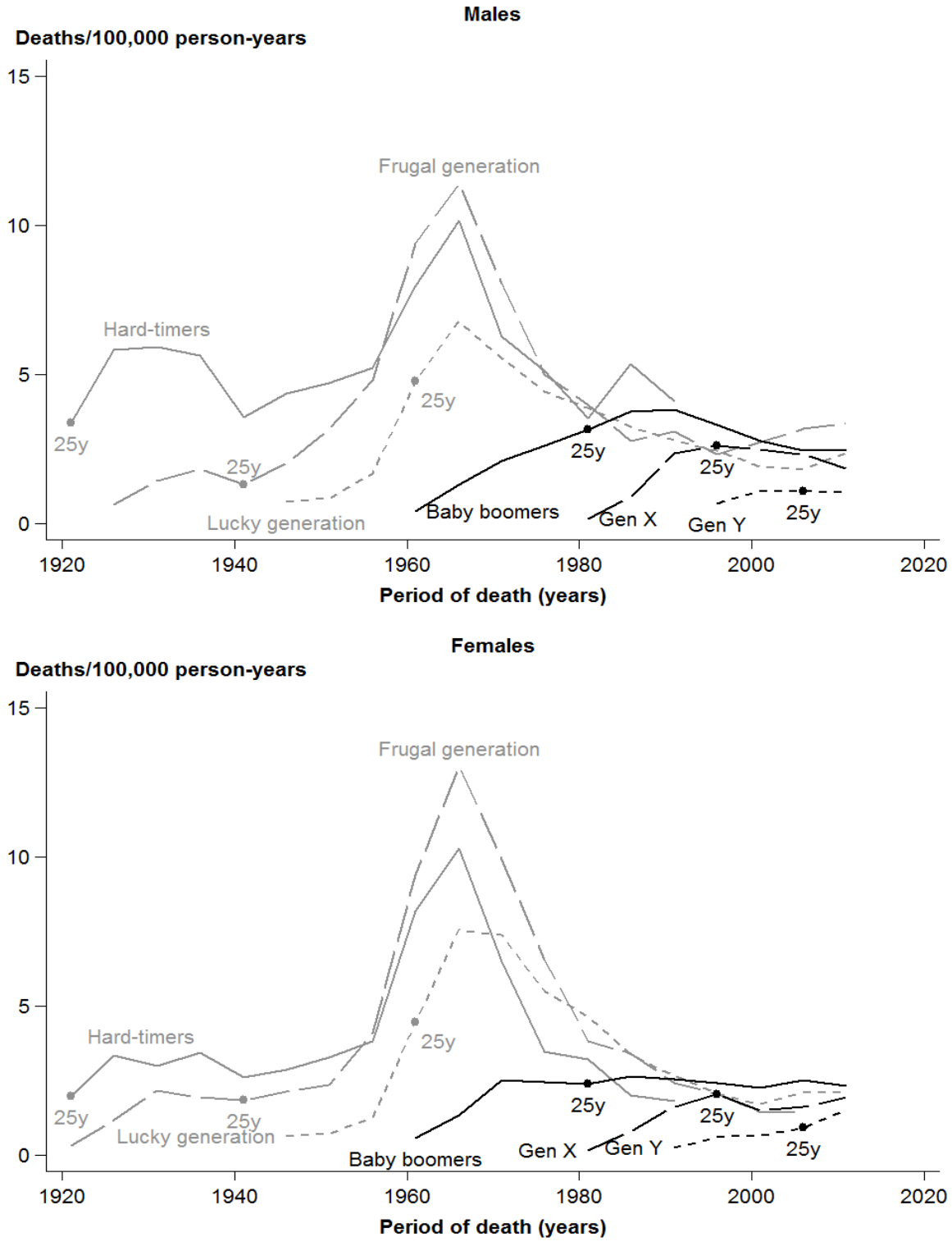
Source: AIHW: Harrison & Henley 2014.

Figure C1.3: Male and female rates of suicide by firearms, by period of birth and period of death, Australia, 1921 to 2010



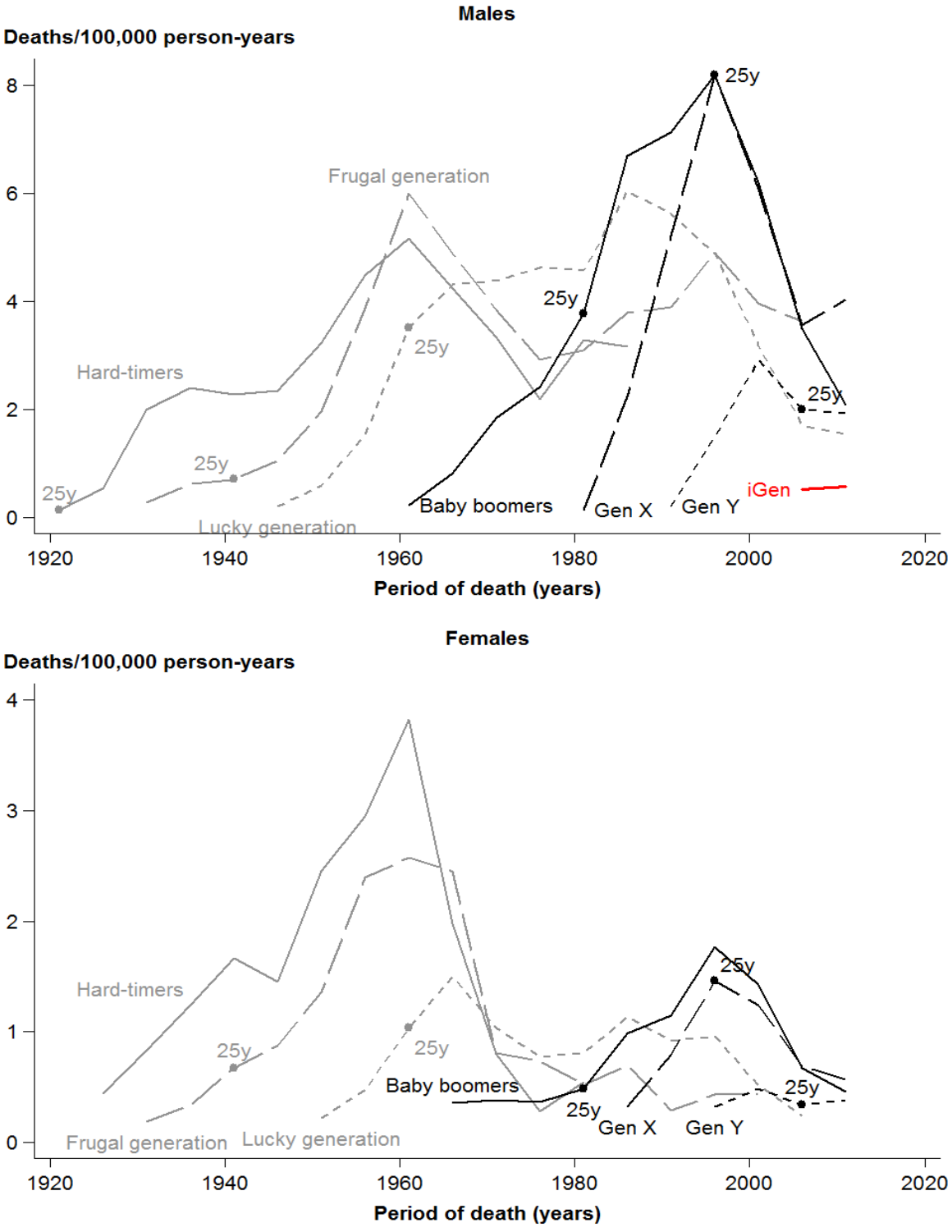
Source: AIHW: Harrison & Henley 2014.

Figure C1.4: Male and female rates of suicide by poisons (except gas), by period of birth and period of death, Australia, 1921 to 2010



Source: AIHW: Harrison & Henley 2014.

Figure C1.5: Male and female rates of suicide by gas, by period of birth and period of death, Australia, 1921 to 2010



Source: AIHW: Harrison & Henley 2014.

Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
CO	carbon monoxide
ICD	International Statistical Classification of Diseases and Related Health Problems
ICD-10	International Statistical Classification of Diseases and Related Health Problems, 10th Revision
ICD-9	International Statistical Classification of Diseases, Injuries and Causes of Death, 9th Revision
ICD-8	International Statistical Classification of Diseases, Injuries and Causes of Death, 8th Revision
ICD-7	International Statistical Classification of Diseases, Injuries and Causes of Death, 7th Revision
ICD-10-AM	International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification
MCoD	multiple cause of death
MVEG	motor vehicle exhaust gas
NCIS	National Coronial Information System
UCoD	underlying cause of death
WHO	World Health Organization

Glossary

age-standardisation: A method of removing the influence of age when comparing populations with different age structures. This is usually necessary because the rates of many diseases vary strongly (usually increasing) with age. The age structures of the different populations are converted to the same 'standard' structure, and then the disease rates that would have occurred with that structure are calculated and compared.

associated causes of death: All causes listed on the death certificate, other than the **underlying cause of death**. They include the immediate cause, any intervening causes, and conditions that contributed to the death but were not related to the disease or condition causing the death.

cause of death: From information reported on the medical certificate of cause of death, each death is classified by the underlying cause of death, according to rules and conventions of the 10th revision of the **International Statistical Classification of Diseases and Related Health Problems**. The underlying cause is defined as the disease that initiated the train of events leading directly to death. Deaths from injury or poisoning are classified according to the circumstances of the fatal injury, rather than to the nature of the injury. See also **underlying cause of death**.

crude death rate: The number of deaths in a given period divided by the size of the corresponding population (typically expressed per 1,000 or per 100,000 population).

external cause: The term used in disease classification to refer to an event or circumstance in a person's external environment that is considered to be the cause of injury or poisoning.

International Statistical Classification of Diseases and Related Health Problems: The World Health Organization's internationally accepted classification of death and disease. The 10th revision (ICD-10) is currently in use.

multiple causes of death: All causes listed on the death certificate. This includes the **underlying cause of death** and all **associated causes of death**.

population estimates: Official population numbers compiled by the Australian Bureau of Statistics at both state and territory and statistical local area levels, by age and by sex, at 30 June each year. These estimates allow comparisons to be made between geographical areas of differing population sizes and age structures.

underlying cause of death: The disease or injury that initiated the train of morbid events leading directly to a person's death, or the circumstances of the accident or violence that produced the fatal injury.

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List of tables

List of figures

Related publications

AIHW (Australian Institute of Health and Welfare): Harrison JE & Henley G 2014. Suicide and hospitalised self-harm in Australia: trends and analysis. Injury research and statistics series no. 93. Cat. no. INJCAT 169. Canberra: AIHW.

Suicide rates at ages 10 years and older were examined for the Australian men and women born in each 5-year period from 1954–58 to 2004–08. Suicide rates for the most recently-born male cohorts are similar to, or lower than, earlier male cohorts at the same age. Suicide rates for the most recently-born female cohorts are higher than those for earlier female cohorts at the same age.

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