



## **Suicide in Australia: Trends and data for 1998**

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### ***Key points***

- Suicide is becoming relatively more prominent as a cause of 'external cause' deaths, mainly because deaths from motor vehicle crashes and other 'external causes' are declining and because the all-ages suicide rate for males have tended to increase in recent years.
- Long-term trends for female suicide rates remained fairly stable over time, except for the large increase in the 1960s, which was followed by a decrease.
- Suicide case numbers and rates rose by about 9% from 1996 to 1997, a large increase but less than the 14% increase in the number of suicide registrations.
- A further rise of about 1% is likely to have occurred from 1997 to 1998.
- The rise in suicide is largely an increase for males aged 20 to 39 years.
- Rates for males aged 15-19 years have not risen in recent years.
- Hanging has become the dominant means for suicide and use of this means is accelerating. Rates of suicide by hanging remain much higher for males than females, but are increasing for both genders.

## Introduction

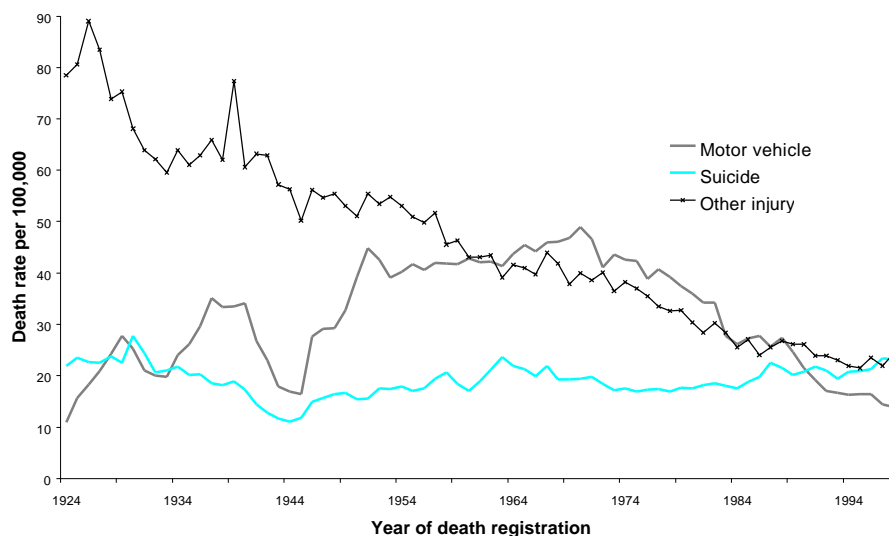
More than 2,500 people die by suicide in Australia each year. This report reviews suicide trends to 1998, presents a summary of suicides registered in 1998 and discusses some issues relating to registration of suicide cases.

### 1. National trends in suicide

Figures 1 and 2 show, for males and females respectively, trends for age-standardised all-ages suicide rates in comparison with trends for other 'external causes' of death. ('External causes' are factors that result in injury and poisoning.)

All-ages rates of suicide fluctuated during the twentieth Century, but did not show a strong long-term trend. In contrast, mortality from other causes declined, with the result that suicide became relatively more prominent as a cause of death in the latter part of the Century. Mortality due to road crashes has declined greatly since about 1970, and mortality due to all external causes other than suicide and road crashes has declined for longer than that. Mortality from other causes (ie diseases) has also declined considerably, but is not shown here.

The increasing relative prominence of suicide, as other causes of death have declined, is one factor prompting the recent increase in public health attention directed to suicide and its prevention.

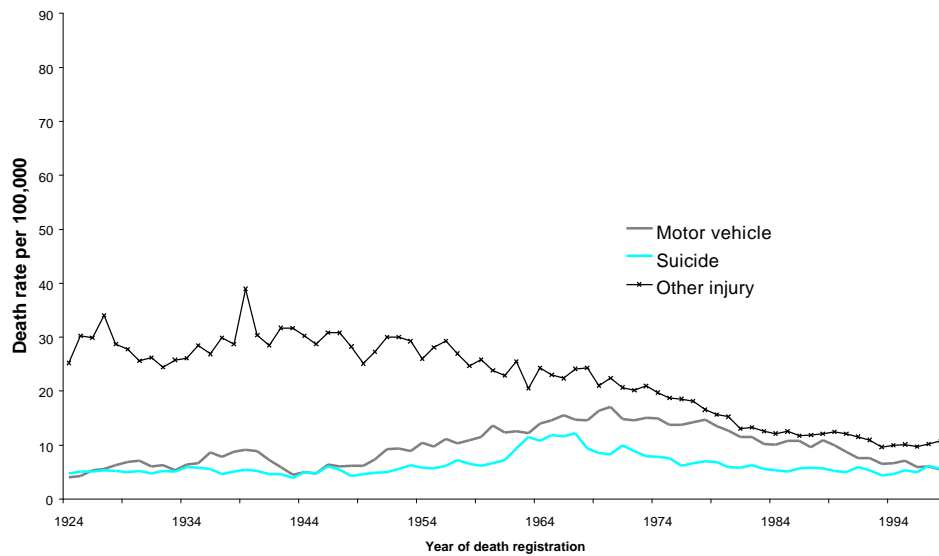


**Figure 1 : External causes of deaths for males of all ages in Australia, 1924-1998.**

Categories used in this Figure are Motor vehicle: E810-E825; Suicide: E950-E959; and Other injury: remainder of E800-E999. The apparent dip in the rates over the WWII period is at least partly an artefact due to non-adjustment of the population denominator for the significant number of males outside the country while on service. Corrected population estimates are not available.

- Suicide has been a commoner cause of male death than road crashes since about 1990 (Figure 1). In 1997 the male suicide rate also exceeded the rate of mortality due to all external causes other than road crashes.

- Female suicide rates are much lower than are those for males. Figure 2 has been given the same vertical scale as Figure 1 to show the difference.

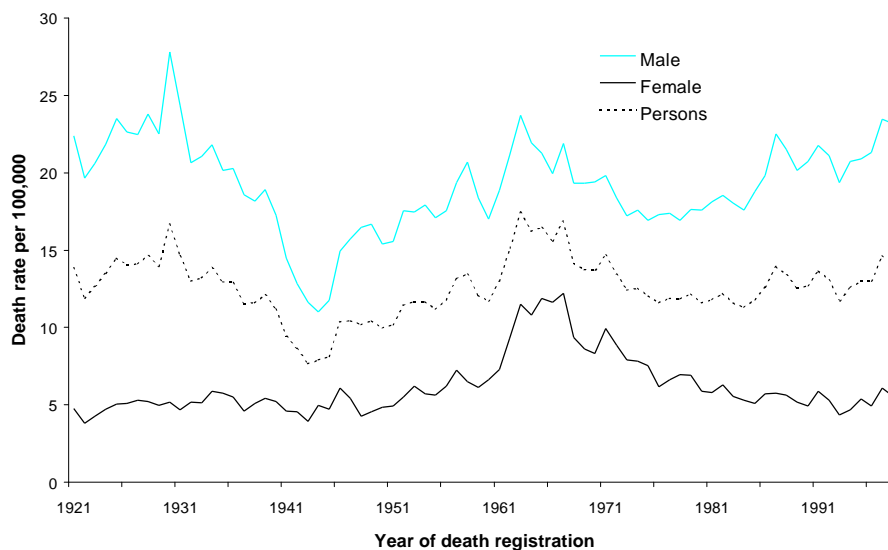


**Figure 2 : External causes of deaths for females of all ages in Australia 1924-1998.**

Categories used in this Figure are Motor vehicle: E810-E825; Suicide: E950-E959; and Other injury: remainder of E800-E999.

- In 1997 and 1998 the female rate for suicides and deaths due to motor vehicle crashes were equal, whereas in previous years, the suicide rate was lower than the rate for motor vehicle crashes.

Figure 3 shows that during the 1960s, suicide rates for both genders increased notably. This corresponded with an increase in suicide by poisoning, at a time when barbiturates, as well as other toxic sedatives and tranquillisers were available and widely used.<sup>1</sup>



**Figure 3 : Suicide rates for males, females, and persons, Australia 1921-1998.**

The apparent dip in the rates over the WWII period is at least partly an artefact due to non-adjustment of the population denominator for the significant number of males outside the country while on service. Corrected population estimates are not available.

- Both male and female all-ages suicide rates fell after the peak of the 1960s, but a divergence in rates emerged during the 1980s with male rates rising while female rates did not. The ratio of male to female suicide rates rose from 2:1 in the 1950s to about 4:1 in the 1990s.
- The overall rate of suicide for persons of all ages rose 14% from 1996 to 1997, based on the numbers of suicides registered in each year. Data on the numbers of suicide occurrences indicate that the true rise was 9% (see Section 5 and Data Issues).

**For males:**

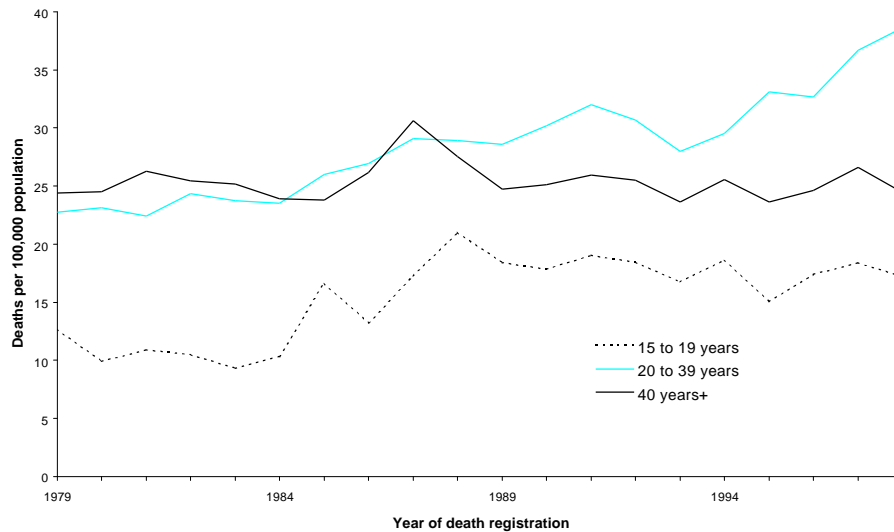
- The all-ages suicide rate for males has tended to rise in recent years.
- There was a marked increase in suicide rates from 1996 to 1997. The rate in 1998 was marginally below that in 1997.
- The all-ages standardised rates of male suicide registered in 1997 and 1998 were the highest since 1963 and, before that, 1931.

**For females:**

- The all-ages suicide rate remained fairly stable until the 1960s when it showed a significant increase, followed by a decrease.
- Rates in recent years are similar to those seen before the mid-century peak.

## 2. Recent trends in suicide rates by age group and sex

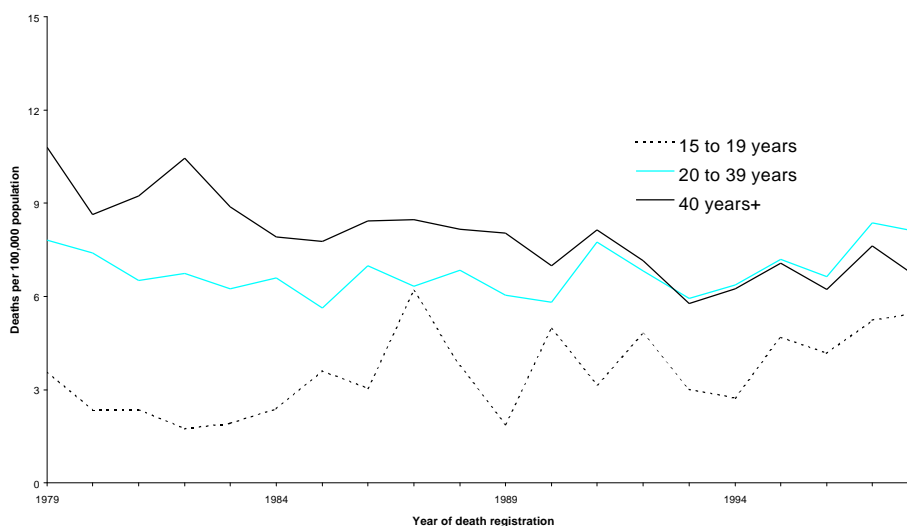
The recent rise in all-ages male suicide rates has been due to an increase in the rates for males aged in the third and fourth decades of life (Figure 4).



**Figure 4 : Suicide rates for selected male age groups, Australia 1979-1998.**

- Rates for males aged 20 to 39 years continued to rise in 1998. Rates for younger males (ie 15 to 19 years) and older males (ie those aged 40 years and older) in recent years have been lower and do not show a strong trend. This contrasts with the rapid rise in rates at ages 15 to 19 years in the 1980s and the decline in rates at older ages, especially in the 1970s.

While suicide trends for males at different ages differ substantially, recent suicide rates for females show less variation with age (Figure 5).

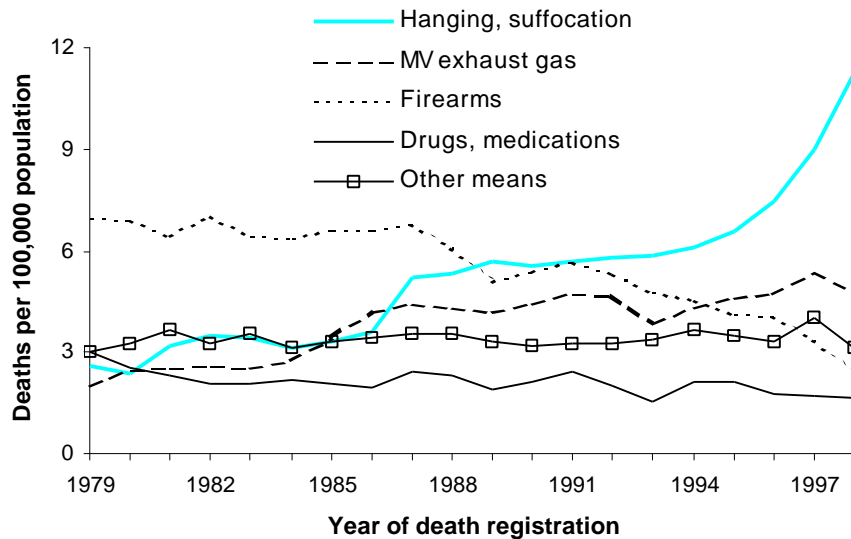


**Figure 5 : Suicide rates for selected female age groups, Australia 1979-1998.**

- Rates at ages 15 to 19 years and 40 years and older appear to have risen since the mid-1990s, though these trends are not large in relation to year-to-year variations.

### 3. Trends in method of suicide

Trends differ markedly between means of suicide (Figures 6 and 7). The largest recent change is the rise in suicide by hanging (see next section). Suicide by means of firearms has declined by more than half since the late 1980s. Suicide by motor vehicle exhaust gas increased roughly in parallel with the decline in firearm cases.

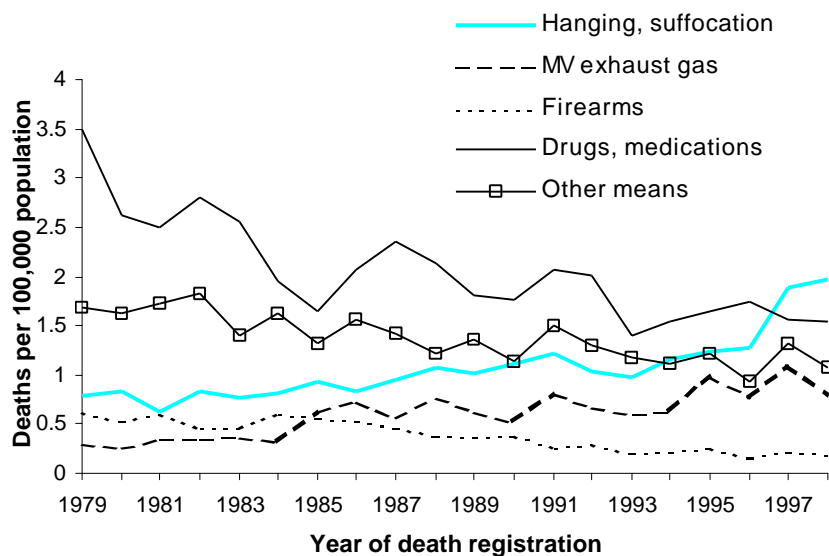


**Figure 6 : Trends in methods used in male suicides at all ages, Australia 1979-1998.**

Categories: Hanging, suffocation: E953; MV exhaust gas: E952.0; Firearms: E955.0-.5; Drugs, medications E950.0-.5; Other means: rest of E950-959

- Hanging has been the commonest means of suicide by males since 1992. The rate of male suicide by hanging more than tripled in the period shown.
- The rate of suicide by motor vehicle exhaust fumes has increased, although to a lesser extent than hanging. This became the second commonest means of suicide by males in 1995.
- The rate of suicide by means of a firearm decreased, especially after 1988. The annual rate varied from 6.0 to 6.8 per 100,000 males in the decade ending in 1988. The rate in 1998, 2.3 per 100,000 men, was about one-third the earlier rate.
- The rise in the rate for the composite category for suicide by “other and unspecified” means was mainly due to increases in falls and jumps (from high structures), threats to breathing (other than hanging) and being struck by moving objects (eg vehicles). Rates of suicide by other methods remained fairly stable over time (eg electricity, fire/flames, drowning).

Smaller changes have occurred in the methods of suicide used by females in this period (Figure 7).



**Figure 7 : Trends in methods used in female suicides at all ages, Australia, 1979-1998.**

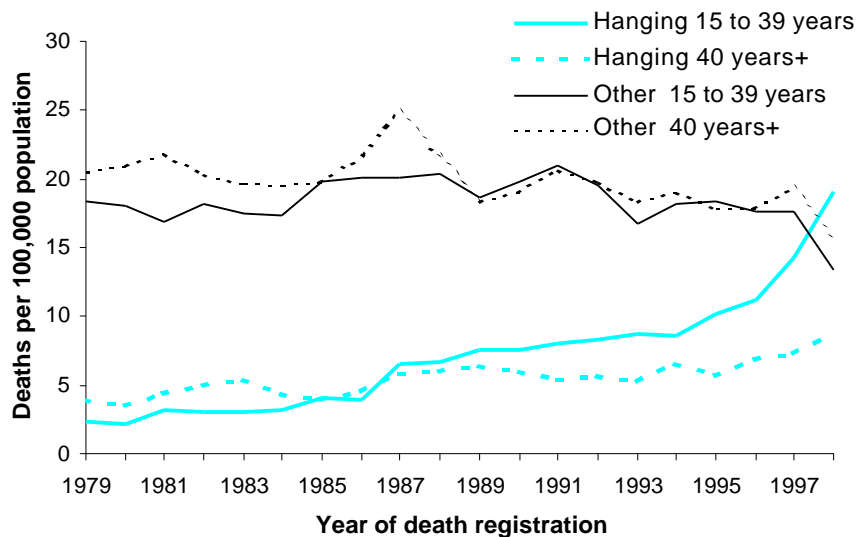
Note that the scale of the vertical axis differs from that in Figure 6.

Categories: Hanging, suffocation: E953; MV exhaust gas: E952.0; Firearms: E955.0-.5; Drugs, medications E950.0-.5; Other means: rest of E950-959

- The most notable change is a decrease in suicide by poisoning by solid and liquid substances. This is the tail end of the epidemic of suicide by means of medications that peaked in the 1960s. The rate in 1979 was 3.5 per 100,000 population and in 1998 it was 1.7 per 100,000 population.
- The rate of suicide by hanging rose for females, though much less than for males. Hanging comprised 10% of all female suicide in 1979, rising to 32% in 1998. Hanging became the second commonest means of suicide by women in 1996, and in 1998 it was more common than suicide by poisoning.
- The rate of female suicide by motor vehicle exhaust fumes has tended to rise in recent years.

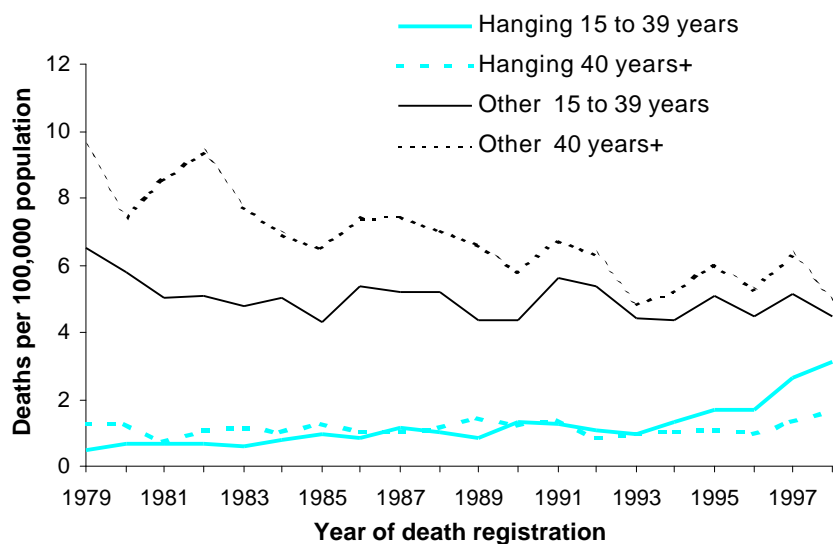
## Hanging

Suicide by hanging has increased greatly, both in absolute terms and as a proportion of all suicides. While an increase has been noted previously, it warrants further attention because the latest mortality data show that the increase has continued and accelerated. Suicide by hanging, strangulation and suffocation [E953] rose from 13% of all suicides in 1980 to 45% in 1998. The 1,217 suicide deaths by hanging, strangulation and suffocation are 15% of all external cause deaths, up from 2% in 1980. Of these deaths, 1,184 were coded as hanging [E953.0].



**Figure 8 : Male suicide by hanging and all other means, by selected age groups, Australia 1979-1998.**

Categories: Hanging: E953.0; Other: remainder of E950-E959.



**Figure 9 : Female suicide by hanging and all other means, by selected age groups, Australia 1979-1998.**

Categories: Hanging: E953.0; Other: remainder of E950-E959.

- The increase in hanging is most marked at ages 20 to 39 years, but it can be seen for all five-year age groups from 15 to 19 years to 50 to 54 years. This cause of death is much more common for males than females, but an increase is evident for younger adults of both genders (Figures 8 and 9).
- Overall rates of suicide by all methods other than hanging are declining for males and are static for females. In 1998, suicides by hanging accounted for more than half of all suicides by males aged 15 to 39 years.



## 4. Suicide deaths registered in 1998

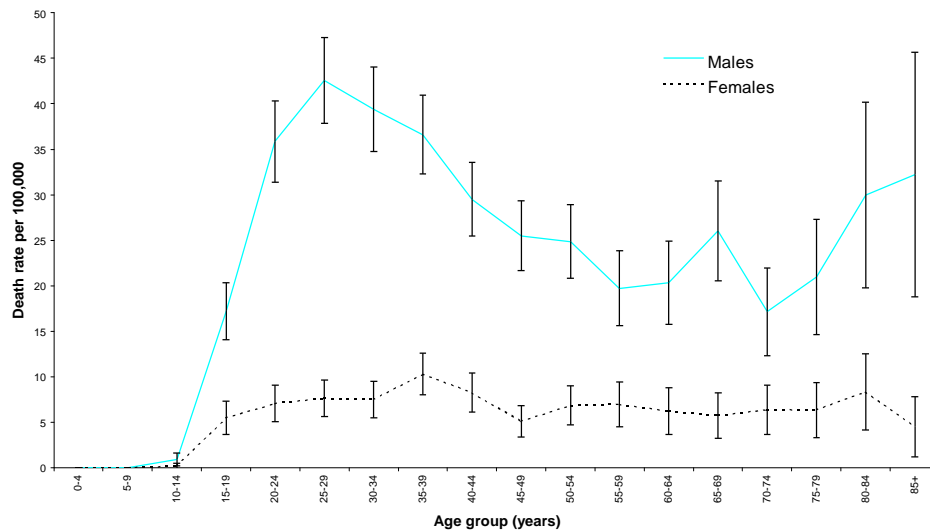
This section summarises all suicides registered in Australia in 1998.

**Table 1 : Key indicators for 1998 suicide deaths, Australia.**

Indicator	Males	Females	Persons
<b>Suicide deaths registered</b>	<b>2,150</b>	<b>533</b>	<b>2,683</b>
% of all injury deaths	38.3%	22.9%	33.8%
<b>Crude rate/100,000</b>	<b>23.1</b>	<b>5.7</b>	<b>14.3</b>
<b>All-ages rate/100,000 (adjusted)*</b>	<b>23.1</b>	<b>5.6</b>	<b>14.3</b>

\* Adjusted by direct standardisation taking the Australian population in 1991 as the standard.

In 1998, the male to female ratio for registered suicide deaths was 4:1.



**Figure 10 : Age-specific rates of suicide registrations for males and females by age group, Australia, 1998.**

Error bars indicate 95% confidence intervals for rates.

- Rates for males are highest at ages 20 to 39 years and males at ages 80 years and older.
- A peak in the 65 to 69 year age group can be also seen (Figure 10). This profile was not seen in 1997 and is mainly due to a large increase in suicide deaths registered in SA for this age group. Occasional variations of this size may occur by chance.

## Method of suicide in 1998

Table 2 shows the numbers of male suicides registered in 1998 by age group and method.

**Table 2 : Methods of suicide: case counts by age group for males, Australia, 1998**

Age group (in years)	Hanging	Motor vehicle exhaust	Firearm	Poisoning	Cutting/Piercing	Other/unspecified	TOTAL
10-14	4	0	2	0	0	0	6
15-19	78	8	10	4	1	15	116
20-24	151	31	24	13	1	28	248
25-29	164	59	25	29	3	34	314
30-34	149	64	13	21	3	27	277
35-39	138	67	14	27	5	22	273
40-44	75	61	21	16	6	27	206
45-49	55	53	13	21	5	20	167
50-54	57	38	15	14	5	18	147
55-59	37	19	13	8	2	9	88
60-65	28	14	12	5	2	14	75
65-69	31	12	21	11	2	10	87
70-74	15	10	15	1	0	8	49
75-79	13	5	8	3	2	11	42
80-84	13	6	6	5	0	3	33
85+	4	4	5	0	1	8	22
Total	1012	451	217	178	38	254	2,150

Sections shaded in blue indicates most common method for specific age group and sections shaded in grey the second most common method. Categories: Hanging: E953.0; Motor vehicle exhaust: E952.0, Firearm: E955.0-.4; Poisoning (solid, liquids): E950; Cutting/Piercing: E956; Other: remainder of E950-E959.

- The proportion of suicide deaths by hanging increased between 1997 and 1998: in 1997 hanging formed 35.9% of registered suicide deaths in males, but in 1998 it comprised 47.1%.
- In 1998, hanging was the leading method of suicide in males aged 10 to 84 years. In males aged 85 years or more, 'other specified' methods were the most common method. These were mostly due to drowning (six out of the eight cases).
- Of suicides by males, about two-thirds of those aged between 10 and 24 years old hanged themselves, whereas about half of men aged 25 to 39 years committed suicide by hanging. For males between 40 and 84 years, hanging made up at least one-third of the suicide cases.
- For males aged between 20 and 65 years, motor vehicle exhaust was the second most common method used to commit suicide.
- Suicides by firearms declined from 1997 to 1998. In 1997 firearms comprised 14.4% of suicide deaths and in 1998 the proportion was 10.1%.

Table 3 shows equivalent data for female suicides registered in 1998.

- Hanging was the commonest method for young women.
- Poisoning by solid and liquid substances was the commonest method for middle-aged and older women.

**Table 3 : Methods of suicide: case counts by age group; Females, Australia, 1998**

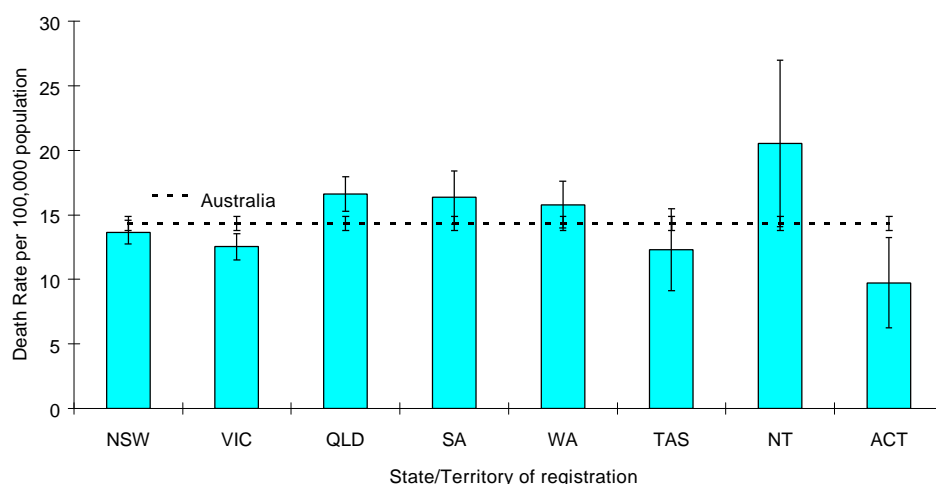
Age group (in years)	Hanging	Motor vehicle exhaust	Firearm	Poisoning	Cutting/piercing	Other/unspecified	TOTAL
10-14	1	0	0	0	0	0	1
15-19	23	0	2	4	0	6	35
20-24	18	7	2	10	0	10	47
25-29	19	6	4	19	0	8	56
30-34	24	5	1	15	1	7	53
35-39	24	19	2	24	2	6	77
40-44	15	9	2	17	1	14	58
45-49	8	8	2	8	0	7	33
50-54	10	8	0	11	1	9	39
55-59	8	2	0	10	1	9	30
60-65	8	4	0	4	2	5	23
65-69	5	2	0	7	0	6	20
70-74	5	4	0	8	1	3	21
75-79	2	1	1	9	0	4	17
80-84	1	2	1	7	1	3	15
85+	1		0	5	0	1	7
Total	172	77	17	158	10	99	532

Highlighted sections indicates most common method for specific age group and underlined sections the second most common method. In one case, the age of the female was unknown.

Categories: Hanging: E953.0; Motor vehicle exhaust: E952.0, Firearm: E955.0-4; Poisoning (solid, liquids): E950; Cutting/Piercing: E956; Other: remainder of E950-E959.

## States and Territories

Rates of suicide varied between States and Territories in 1998. Victoria and ACT had suicide rates significantly lower than the national average, whereas Queensland had a rate that was significantly higher than the national average rate (Figure 11).



**Figure 11 : Suicide rates by State/Territory, Australia, 1998.**

Error bars indicate 95% confidence intervals for rates.

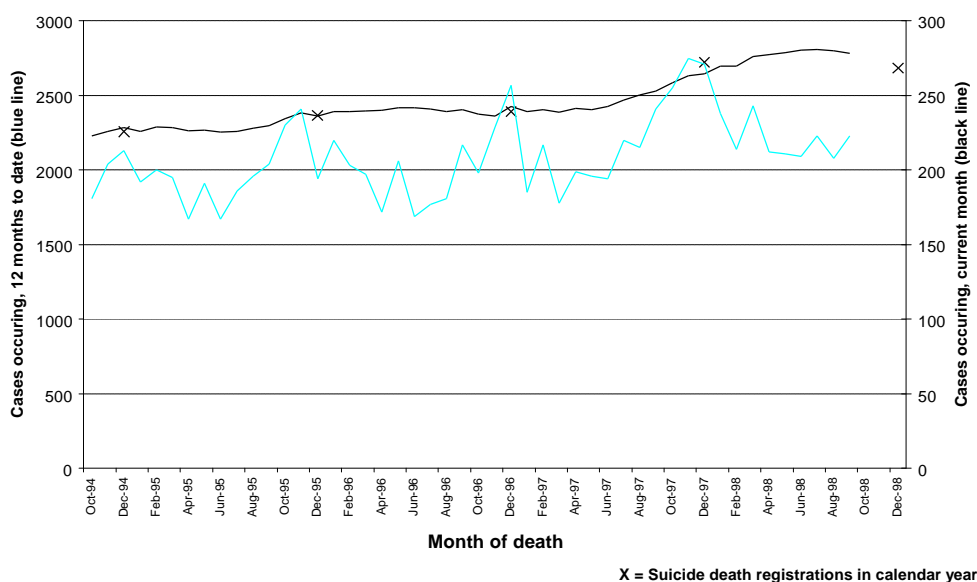
## 5. Trends in occurrence and registration of suicide

Suicides in Australia are generally reported in terms of the number of cases registered by Registrars of Births, Deaths and Marriages during each calendar year. Numbers of cases for recent years are shown in Table 4.

**Table 4 : Suicide Australia, persons (case numbers registered and occurring)**

	Registrations in calendar year	Deaths in years to end September
1994	2258	2220
1995	2367	2296
1996	2393	2407
1997	2723	2529
1998	2683	2782

- The number of registrations by calendar year shows considerable year to year variation, a large increase from 1996 to 1997 (14%) being followed by a decrease from 1997 to 1998 (-1.5%).
- Deaths can also be reported according to the year in which they occur. For purposes such as public health monitoring, year of occurrence is a better basis for reporting than year of registration, because it provides a more direct estimate of incidence. Case counts by year of occurrence are also presented in Table 4. The reporting periods used for this purpose are years to September, because of characteristics of currently available deaths data which complicate timely report on a year-of-occurrence basis (see Data Issues).



**Figure 12 : Suicide Australia: Rolling 12-month case counts based on registrations from October 1994 to September 1998.**

Figure 12 presents numbers of suicide cases in Australia based on date of death. It covers the latest four-year period for which sufficiently complete data are available.

The blue line in Figure 12 represents the number of suicide deaths that occurred in Australia during the 12-months ending with each month, from October 1994 to September 1998 (ie it is a rolling 12-month case count). The black line shows the number of suicide deaths that occurred in each month in this period. The lines are not continued after September 1998 because underestimation due to omission of cases not registered until after the end of 1998 becomes substantial near the end of the period for which registration data are available (see Data Issues).

Figure 12 also shows (as 'X') the number of suicide registrations in each of the five calendar years 1994 to 1998.

- Assessment based on year of death shows a more steady increase in suicide case numbers during recent years than does the number of registrations. While suicide registrations increased by 14% from 1996 to 1997, suicide deaths increased 9%.
- Monthly suicide case numbers show seasonal variation, being higher in summer than in winter. A particularly large peak occurred in the summer of 1997/98, which accounts for the rise in rolling annual case counts in the period after mid 1997.

The number of suicide deaths in 1998 can only be estimated at this stage. Two methods both suggest that the number will be about 1% higher than in 1997 (see Data Issues). These estimates contrast with a reduction of 1.5% in suicide registrations from 1997 to 1998.

## 6. References

1. Harrison J & Moller J. 1998. Chapter 14: Learning from experience: towards prevention. In: Selby H (Ed) *The Inquest Handbook*. The Federation Press: Leichhardt.

## 7. Data issues

### Data sources

Deaths data are from the Australian Bureau of Statistics (ABS) mortality unit record data collection, 1979-98. Population data were also obtained from the ABS. Rates for 1998 were calculated using final population estimates as provided by the ABS.

### Case definition

The cause of each death registered in Australia is classified by the ABS according to the International Classification of Diseases (ICD). The 9th revision (ICD9) has been used for death registrations beginning in 1979. All deaths given an ICD9 "External Cause" code by the ABS are included in this Bulletin.

### Age adjustment

Rates have been adjusted to overcome the effect of differences in the proportions of people of different ages (and different injury risks) in the populations that are compared. Direct standardisation was employed, taking the Australian population in 1991 as the standard. Changes in age composition are small within narrow age bands (eg 15 to 19 years) and adjustment has not been applied to 5-year age groups. Where crude rates are reported this is noted.

## **Confidence intervals**

All (or nearly all) deaths are registered, so sampling errors do not apply to these data. However, the time periods used to group the cases (ie. calendar years) are arbitrary. Use of another period (eg. July to June) would result in different rates. Where case numbers are small, the effect of chance variation on rates can be large. Confidence intervals (95%, based on a Poisson assumption about the number of cases in a time period) have been placed around rates as a guide to the size of this variation. Chance variation alone would be expected to lead to a rate outside the interval only once out of 20 occasions.

## **Time series**

Most of the time trends analyses have been presented for the period 1979 to 1998. This is the period during which Australian death data have been classified according to the 9th revision of the International Classification of Diseases (ICD9). Earlier data were coded to previous revisions of ICD.

## **Cause code aggregations**

NISU statistical publications make use of standard aggregations of the ICD9 external cause (E-code) classification. Categories used in this publication are Total suicide: E950-E959. Where relevant, the subdivision of suicide into various methods is noted.

## **Data reliability**

The chief question concerns the reliability of information about type of injury death. This depends principally on the information available in coroner's records, and on the reliability of the application of ICD9 E-codes, generally based on that information. Little empirical information is available. There is considerable potential for factors to do with information recording or coding to affect data in different ways for different states and territories. Hence, apparent differences between jurisdictions should be interpreted with caution. Beginning with 1993 registrations, coding has been centralised at the Brisbane office of the ABS.

Suicide may be especially susceptible to misclassification because the intention of a deceased person is not always clear, especially with causes of death such as drowning and drug overdoses. Also, social disapproval of suicide might prompt some cases to be presented in a way that leads them not to be recorded as such.

## **Reporting deaths data according to date of occurrence**

Delay occurs between the date on which a death occurs and the date on which it is registered. It is the practice of the Australian Bureau of Statistics to release one annual mortality data file, containing deaths registered in a particular calendar year. Consequently, essentially complete date of occurrence data for a particular calendar year (say 1997) are not available until year of registration data are released for the following year (ie 1998 registrations, released late in 1999).

Most of the suicides that are not registered during the calendar year in which they occur happen in November and December. Hence, registrations to the end of 1998 are likely to include nearly all cases that occurred to the end of September 1998. If patterns observed for recent years continued in 1998, then the occurrence estimate for the year to September 1998 should be about 99% complete (in relation to the case numbers that will be known after 1999 registrations data become available). Similarly, the estimate for cases during the month of September 1998 should be about 97% complete. Likely completeness would be lower if

estimates were for years to October (98% and 93%) or November (97% and 88%), and much lower if to December (91% and 37%).

### **Estimates of suicide case count in 1998**

The conclusion stated in the text that final suicide case numbers for 1998 are likely to be a little higher than the number in 1997 is based on these and similar assessments of available data:

Of the 2646 suicides that occurred in 1997 and had been registered by the end of 1998, 6.6% were registered in 1998. If the same proportion of 1998 suicide deaths is registered in 1999, then the final number of suicide occurrences in 1998 will be about 1% higher than the number in 1997 (n=2646).

Case numbers in August and September 1998 were lower than in the corresponding month of 1997, suggesting that the 1998/99 summer peak may not have been as large as that in 1997/98. However, case numbers were higher in mid-1998 than in mid-1997. If the number of cases in the last quarter of 1998 was no higher than the number in the last quarter of 1996, then the final number of suicides in 1998 will be about 1% higher than the number in 1997.

Recent trends in suicide registrations are a less good guide to trends in case numbers than usual. The main reason is that the number of registrations in 1997 was inflated by an administrative practice which had the effect of registering some deaths late in 1997 which would (had previous practice prevailed) have been registered in 1998. The 14% rise in suicide registrations from 1996 to 1997 overestimates the rise in cases, which was about 9%. The same event will probably have the opposite effect in 1998, causing registrations to underestimate case numbers. It is difficult to estimate the size of the effect, but the observed 1.5% drop in registrations could certainly be found to correspond to a small rise in cases.

## Communications

Inquiries, comments and letters are welcome. Please address those concerning this Issue to:

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