

Suicide in the Northern Territory, 1981–2002

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Suicide rates in Australia increased steadily during the 1990s, peaking in 1997 with a rate of 15 deaths per 100 000 population.¹ Subsequently, the national rate appeared to plateau, with fewer deaths reported in 2002.² In the Northern Territory, however, the age-adjusted rate of suicide has been consistently higher than the national rate since 1996, and is still rising.²⁻⁴ Only 1% of Australians live in the NT, and its demography differs substantially from that of the rest of Australia: 70% of its people live in rural areas;⁵ the population is relatively young (in 2002, the median age of residents was 29.9 years, 6 years lower than the national median of 35.9 years);⁵ Aboriginal and Torres Strait Islander people comprise nearly 30% of the population (compared with less than 4% in other Australian jurisdictions); and there are more males than females (NT Government, unpublished data).

To date, there has been little detailed information available on the epidemiology of suicide in the NT, particularly with regard to changes in rates over time among various population groups. The aim of our study was to investigate trends in suicide in the NT between 1981 and 2002 and to examine demographic and other characteristics of people completing suicide between 2000 and 2002.

METHODS

Data sources

Data were obtained from three sources: Australian Bureau of Statistics (ABS) death registration data, NT Department of Health and Community Services population data, and NT Coroner's Office data. All deaths recorded in the ABS death registration database for the period 1981–2000 were included in our analysis. The NT Registrar of Births, Deaths and Marriages and other jurisdictional registrars collected the initial death data, including age, sex, Indigenous status and cause of death. The ABS classified the cause of death using ICD-9 (the International classification of diseases, ninth revision) for deaths registered from 1981 to 1996 and ICD-10 (10th revision) for deaths registered from 1997 to 2000. Suicide deaths were identified using ICD-9 codes E950–E959 and ICD-10 codes X60–X84. The reliability of Indigenous status in death registration data in the NT was consistently high over the study period.^{6,7}

ABSTRACT

Objective: To examine trends in suicide in the Northern Territory between 1981 and 2002, and demographic and other characteristics of people completing suicide in the Top End region in 2000–2002.

Design: Retrospective descriptive analysis of Australian Bureau of Statistics death registration data and data from the NT Coroner's Office.

Setting and participants: All residents of the NT who completed suicide between 1981 and 2002.

Main outcome measures: Changes in the age-adjusted and age- and sex-specific rates of suicide in Indigenous and non-Indigenous NT residents over time; prior diagnosis of mental illness and use of alcohol or other drugs by those completing suicide.

Results: The age-adjusted suicide rate in the NT increased significantly between 1981 and 2002 ($P < 0.001$). Over this period, the rates among the Indigenous and non-Indigenous male populations increased by 800% ($P < 0.05$) and 30% ($P > 0.05$), respectively. Indigenous males aged under 45 years and non-Indigenous males aged 65 years and over were most at risk. In the Top End, a history of diagnosed mental illness was present in 49% of suicide cases, and misuse of alcohol or other drugs around the time of death was associated with 72% of suicide cases.

Conclusion: Our study highlights the rising rate of suicide in the NT and suggests that suicide prevention initiatives need to specifically target Indigenous and non-Indigenous males in the age groups most at risk.

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Deaths suspected of being due to suicide are always the subject of a coronial investigation and are not registered until investigations are complete and a cause of death is assigned. The NT Coroner used a legal basis of proof for the consideration of suicide for the period covered by our study. A finding of suicide was made when it was considered that the deceased intentionally contributed to his or her own death.⁸ Because of the late registration of these and other deaths, ABS death registration data were not available for all deaths occurring in 2000. To obtain complete data for suicides from 2000 to 2002, the NT Coroner's Office granted permission for us to use individual files to collect information on the number of cases and certain factors associated with them. At the time of data collection, coronial investigations were complete for all NT deaths occurring from 2000 to 2002. Information was extracted from the Coroner's files, under strict confidentiality and privacy conditions, with the aid of a survey instrument based on the coding instrument from the Western Australian Coroner's database on suicide.⁹

Seventy-seven per cent of all NT residents live in the "Top End" region, of which the three main centres are Darwin, Katherine and

Nhulunbuy. For residents of this region only, further information on factors such as marital status, employment status, mental illness and alcohol/drug involvement was collected from the NT Coroner's files on suicides occurring between 2000 and 2002. People were considered to be "unemployed" if they were not engaged in full- or part-time work or study at the time of death. Prior mental illness was recorded only in cases in which there was evidence that a general practitioner or mental health professional had diagnosed depression or another mental health condition in the 12 months before death. All deaths that were suspected of being the result of suicide were assessed for evidence of alcohol or cannabis use at or around the time of death. If illicit drug use was suspected, appropriate tests were carried out under the Coroner's direction.

Statistical analysis

Annual age-adjusted death rates by year of occurrence and Indigenous status were calculated using ABS death registration data (for 1981–1999) and NT Coroner's Office data (for 2000 to 2002). Age standardisation was used to control for differ-

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ences between the age structures of the NT and Australian populations. The 1991 Australian estimated resident population was used as the standard population.¹⁰ Suicide death rates by age group, Indigenous status and sex were calculated for the period 1981–2002.

Poisson regression analysis was performed to estimate average annual changes in suicide rates. Death rate ratios and their 95% CIs were calculated. Various interaction terms were added to Poisson regression models to test differences in annual changes between Indigenous and non-Indigenous

populations and between the total NT population and all Australians.

For Top End residents, proportions and 95% CIs were calculated to describe demographic and other characteristics of people who completed suicide in 2000–2002. All analyses were conducted using Stata statistical software, release 8.0 (StataCorp, College Station, Tex, USA).

Ethical approval

Our article is based on data collected for the development of a suicide prevention program rather than for research.¹¹ No individuals or communities were identified, and, therefore, there were no issues relating to confidentiality or privacy that required ethical approval prior to publication.

RESULTS

Trends in suicide

Over the 22-year period 1981–2002, there were 577 deaths due to suicide in the NT, with the overwhelming majority (504 [87%]) being in males. Seventy-five per cent of all suicides were among non-Indigenous people, who comprise 72% of the NT population. In the early 1980s, the suicide rate in the NT was similar to the Australian rate. Between 1981 and 2002, the NT rate rose significantly overall, with an average annual increase of 4.4% ($P < 0.001$), so that by 2000 it was nearly twice the national rate of 13.0 deaths per 100 000 population (Box 1).

The rate of suicide among NT males was significantly higher than among NT females for the period 1981–2002 ($P < 0.001$), with a death rate ratio for males to females of 6.2:1 (95% CI, 4.9–7.9:1) compared with the national average of 4:1.

Suicide rates by Indigenous status and sex

During the 1980s, the age-adjusted suicide rate for NT Indigenous males was about a third that of NT non-Indigenous males, and no suicide deaths were reported for the female Indigenous population (Box 2). However, over the period 1981–2002, the overall rate of suicide increased significantly among both Indigenous males and females, with annual average increases of 17.4% (95% CI, 12.9%–20.8%) for males and 25.8% (95% CI, 12.2%–41.0%) for females. The corresponding annual average increase was 1.2% (95% CI, 0.9%–2.9%) for non-Indigenous males and 5.7% (95% CI, 1.0%–10.8%) for non-Indigenous females.

1 Age-adjusted suicide death rates (number of deaths per 100 000 population) by year and Indigenous status, Northern Territory and Australia, 1981–2002

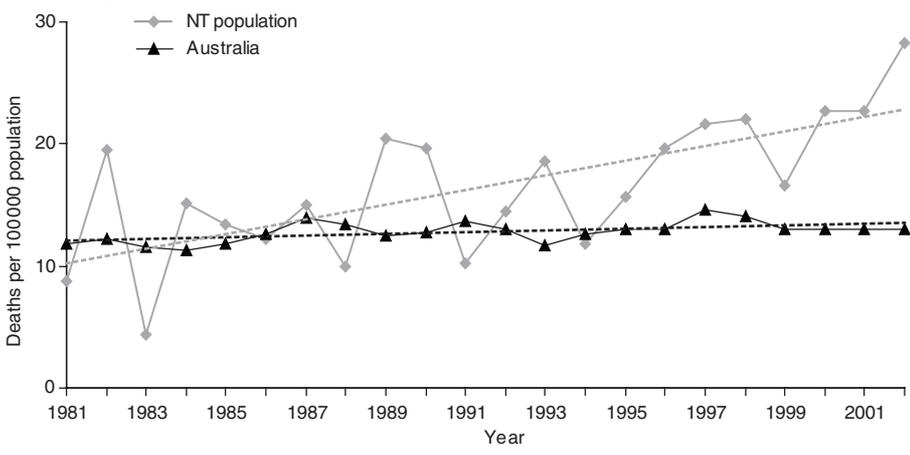
Year	NT Indigenous	NT non-Indigenous	NT total	Australia
1981	6.1	8.9	8.8	11.8
1982	0	27.3	19.5	12.2
1983	1.7	4.9	4.3	11.6
1984	7.4	17.6	15.2	11.3
1985	3.2	17.4	13.4	11.8
1986	4.3	14.3	12.2	12.6
1987	12.4	16.6	15.0	13.9
1988	0	13.2	10.0	13.4
1989	0	27.7	20.5	12.5
1990	2.1	25.0	19.7	12.7
1991	1.6	13.1	10.2	13.7
1992	17.1	14.6	14.5	13.1
1993	8.8	22.3	18.6	11.7
1994	7.5	12.7	11.8	12.6
1995	7.2	18.5	15.6	13.0
1996	24.8	18.3	19.7	13.0
1997	12.4	23.9	21.6	14.6
1998	20.3	21.7	22.1	14.0
1999	31.9	11.0	16.6	13.0
2000	24.6	19.6	22.7	13.0
2001	27.2	19.6	22.7	13.0
2002	50.4	22.8	28.3	13.0

Average annual change (95% CI)*

18.4% (14.1%, 22.8%)	1.8% (0.2%, 3.3%)	4.4% (3.0%, 5.9%)	0.15% (0.0%, 0.2%)
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* $P < 0.001$ for all categories.

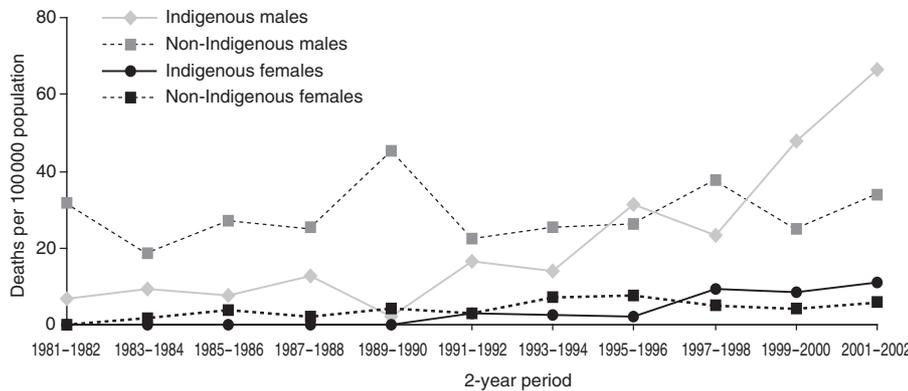
Age-adjusted suicide rate (number of deaths per 100 000 population), NT and Australia, 1981–2002



2 Age-adjusted suicide death rates (number of deaths per 100 000 population [95% CIs]) by sex, Indigenous status and 5-year period, Northern Territory and Australia, 1981–2002

	NT Indigenous	NT non-Indigenous	Australia
Males			
1981–1985	8.0 (1.1, 15.0)	26.7 (15.8, 37.5)	18.1 (17.7, 18.6)
1986–1990	7.5 (1.2, 13.8)	32.9 (24.1, 41.8)	20.9 (20.5, 21.4)
1991–1995	15.1 (7.3, 22.8)	24.7 (18.4, 31.1)	20.7 (20.3, 21.2)
1996–2000	38.0 (27.3, 48.6)	29.9 (23.7, 36.2)	21.7 (21.2, 22.1)
2001–2002	66.3 (45.4, 87.1)	34.0 (21.8, 46.1)	21.7 (21.2, 22.1)
Females			
1981–1985	0	1.0 (–0.1, 2.2)	5.6 (5.4, 5.8)
1986–1990	0	3.7 (1.4, 6.0)	5.4 (5.2, 5.7)
1991–1995	2.2 (0.0, 4.8)	5.5 (1.1, 9.8)	5.1 (4.9, 5.3)
1996–2000	8.1 (3.1, 13.0)	5.4 (2.9, 7.8)	5.3 (5.1, 5.5)
2001–2002	11.2 (2.7, 19.7)	5.9 (2.0, 9.8)	5.3 (5.1, 5.5)

NT age-adjusted suicide rates by sex, Indigenous status and 2-year period, 1981–2002



By 2001–2002, NT Indigenous rates of suicide appeared to be substantially higher than non-Indigenous rates, although the difference was not statistically significant owing to small numbers. The 2001–2002 NT Indigenous male suicide rate of 66.3 deaths per 100 000 population was eight times higher than the corresponding rate in the 1980s and three times higher than the 2001–2002 rate for all Australian males ($P < 0.05$) (Box 2).

Very few suicide deaths were reported in the early 1990s among NT Indigenous

women. But from 1996 onwards, the rate for this group escalated, so that by 2001–2002 it was 11.2 deaths per 100 000 population. This was more than twice the rate for all Australian females, although the difference was not statistically significant owing to small numbers.

During the 1980s, the suicide rates for NT non-Indigenous males were significantly higher than the corresponding Australian rates ($P < 0.05$) and the rates for all other population groups in the NT (Box 2). But,

unlike the Indigenous male suicide rate, the non-Indigenous male rate remained relatively stable in the 1990s. The 2001–2002 rate of 34.0 deaths per 100 000 population was about 1.5 times higher than the corresponding Australian rate, although the difference was not statistically significant ($P > 0.05$).

While the rate of suicide among NT non-Indigenous females appeared to increase between the 1980s and 2000s, the difference was not statistically significant and may be a reflection of small numbers. In 2001–2002, the suicide rate among non-Indigenous females was 5.9 deaths per 100 000 population, which was similar to the Australian rate and significantly lower than that of the corresponding male population ($P < 0.05$).

Age-specific suicide rates

For the period 1981–2002, NT Indigenous males aged 25–44 years had the highest suicide rate of all Indigenous groups (49.5 deaths per 100 000 population) ($P < 0.05$) (Box 3). Indigenous males aged 10–24 years had the second highest rate (27.3 deaths per 100 000 population), and relatively few deaths were recorded for males aged 45 years and over.

In contrast, the risk of suicide appeared to increase with age among NT non-Indigenous males (Box 3). The rate for those aged 65 years and over was the highest for non-Indigenous males (54.9 per 100 000 population), but the rate may be exaggerated due to small numbers.

Suicide rates in females of all age groups were significantly lower than corresponding rates for males, except among NT Indigenous females aged 45–64 years.

The rate for non-Indigenous males aged 45–64 years was over 20 times higher than the corresponding rate for females ($P < 0.05$).

Demographic and other characteristics of Top End residents completing suicide, 2000–2002

Between 2000 and 2002, 105 of the 141 suicide deaths (74%) in the NT were of Top End residents, who comprise 77% of the NT

3 Suicide death rates (number of deaths per 100 000 population [95% CIs]) by sex, Indigenous status and age group, Northern Territory and Australia, 1981–2002

Age group (years)	NT Indigenous		NT non-Indigenous		Australia	
	Male	Female	Male	Female	Male	Female
10–24	27.3 (20.2, 36.2)	6.9 (3.6, 12.0)	22.5 (17.7, 28.3)	6.2 (3.6, 9.7)	16.6 (16.2, 17.0)	3.4 (3.3, 3.6)
25–44	49.5 (38.4, 62.9)	4.9 (2.0, 10.2)	32.1 (27.6, 37.1)	6.1 (4.1, 8.7)	27.9 (27.4, 28.4)	7.0 (6.8, 7.3)
45–64	13.7 (5.5, 28.2)	3.5 (0.4, 12.7)	39.8 (32.5, 48.3)	1.6 (0.3, 4.7)	23.7 (23.1, 24.2)	8.0 (7.7, 8.3)
≥ 65	0	0	54.9 (34.8, 82.4)	5.5 (0.6, 19.8)	27.7 (26.9, 28.6)	7.0 (6.6, 7.3)

4 Demographic and other characteristics of people completing suicide and the general population, Top End region of the Northern Territory, 2000–2002*

	Top End suicide cases [†]	Top End general population [‡]
Marital status		
Married/de facto	39 (37% [27.9%, 46.4%])	56 879 (47%)
Divorced/separated	18 (17% [9.9%, 24.4%])	13 968 (12%)
Single/widowed	43 (41% [31.5%, 50.4%])	50 121 (41%)
Unknown	5 (5% [0.7%, 8.8%])	— [§]
<i>Total</i>	<i>105 (100%)</i>	<i>120 968 (100%)</i>
Employment status		
Employed	50 (48% [38.1%, 57.2%])	69 243 (59%)
Unemployed	43 (41% [31.5%, 50.4%])	4 771 (4%)
Retired/student/unknown	11 (10% [5.3%, 17.5%])	42 480 (37%)
<i>Total</i>	<i>105 (100%)</i>	<i>116 494 (100%)*</i>
Occupation		
Manager/professional/self-employed	9 (18% [7.4%, 28.6%])	27 423 (40%)
Clerk	13 (26% [13.8%, 38.2%])	33 425 (48%)
Physical worker	28 (56% [42.2%, 69.8%])	8 395 (12%)
<i>Total</i>	<i>50 (100%)</i>	<i>69 243 (100%)</i>

* Source of data: NT Coroner's Office. † Expressed as number (% [95% CI]). ‡ Expressed as number (%).

§ The category of "unknown" was excluded in the Top End population figures. ◆

population. Of these 105 people, 61 (58%) had been single, widowed, divorced or separated (Box 4). In comparison, 53% of the Top End population aged 15 years and over were in this category in 2001.⁵ Of those completing suicide, 43 (41%) were unemployed, compared with just 4% in the Top End population (NT Government, unpublished data). Of those in employment, 28 (56%) had an occupation involving physical work, compared with just 12% in the Top End population.⁵

Alcohol use to varying degrees was recorded in 59 suicides (56%) in the Top End, with drug use identified in a further 17 cases (16%). Overall, alcohol and/or drug use was identified in 75 cases (71%). A diagnosis of depression or other mental illness, including previous suicide attempts, was recorded in 51 cases (49%).

DISCUSSION

Our study has revealed a significant increase in suicide rates in the NT over the past two decades, particularly among Indigenous people. The most concerning finding was the dramatic increase in suicide among Indigenous males, who, in 2001–2002, were at substantially greater risk than any other population group in the NT and all Australians in general. Non-Indigenous males in the NT were also at greater risk of suicide than Australian males in general.

The two age groups at highest risk of suicide appear to be Indigenous males aged

under 45 years and non-Indigenous males aged 45 years and over. This is similar to findings reported for Queensland, where Indigenous males in younger age groups were at greatest risk and rates for all Indigenous males were twice those reported for all Queensland males.¹² The methodological differences between the Queensland study and the present study are unlikely to affect the magnitude of the difference between the various population groups.

Although NT annual suicide rates were based on small numbers and were subject to some instability, they distinctly highlight certain trends (Box 1, Box 2). But caution must be exercised in making any generalisations from our findings, given the unusual age distribution of the NT population, the relatively high proportion of Indigenous people in the NT, and the high proportion of the NT Indigenous population living in remote and very remote areas (ABS, unpublished data). A strength of our study is that it provides a more complete picture of Indigenous suicide than is possible in many other Australian jurisdictions. This is because the level of accuracy in identifying Indigenous people in routine data collections is very high in the NT and substantially better than in other Australian jurisdictions.^{6,7}

The finding that 49% of Top End residents who completed suicide had a diagnosed mental illness or a history of attempted suicide is of concern. This result, while lower than the

rate previously reported for the NT (60% of suicide cases in 1991–1998),¹³ is higher than that reported for Western Australia (40%) during the period 1986–1997. This may represent a real difference or may simply reflect differences in data recording.⁹ The significant association, reported elsewhere, between self-harm behaviour and subsequent suicide in the Indigenous population appears to be a relevant issue in the NT context.¹³

A recent national study by Trewin and Madden found that Indigenous males aged 25–44 years were three times more likely to be hospitalised for severe mental illness (such as schizophrenia or delusional disorders) than men in the general Australian population.¹⁴ This group had the highest suicide rate in our study.

Alcohol was involved in 56% of suicide cases, compared with 44% in a previous study of the same population in the 1990s.¹³ This suggests either a strengthening of the association between alcohol consumption and suicide and/or more complete testing and recording of information by the Coroner's Office. In total, alcohol and/or drug use was recorded in 71% of suicide cases in the Top End in 2000–2002. This finding is higher than that reported in WA, where 29% of male and 21% of female suicide cases were associated with current substance misuse.⁹ The association between alcohol misuse and suicide is well recognised.¹⁵ This is of particular concern for the NT, where the per capita consumption of alcohol is the highest of any Australian state or territory.¹⁶

Cannabis use in the NT is also significantly higher than in the rest of Australia.¹⁷ Cannabis misuse is also likely to be more widespread in remote Australian communities than previously reported.¹⁸ There are reports of a significant association between psychiatric issues and substance misuse, and Indigenous people are four times more likely than the total Australian population to be admitted to hospital with psychiatric illness as a result of psychoactive substance misuse.¹⁴ The relationships reported elsewhere between cannabis use and depression, and cannabis use, psychosis and anxious arousal in association with substance intoxication or withdrawal, may all be factors contributing to suicide in the NT context.^{18–21}

Issues pertinent to suicide in rural areas may provide some insight into the findings of our study. "Compositional", "contextual" and "collective" variables²² may all have an impact on suicide in rural settings, and the meaning and further influence of suicide within a disadvantaged remote Indigenous community may also play a role.^{22,23}

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The variables associated with rural suicide outlined above have been the basis for a mental health initiative undertaken by the Tiwi people in the NT. The Tiwi Mental Health Program emphasises community leadership, information sessions on coping with life stress and substance misuse, and crisis plans to deal with specific incidents of threatened suicide (Glen Norris, Private Consultant, Tiwi Island Local Government, personal communication). Although these initiatives have not been formally assessed, they appear to have had some influence in reducing suicidal behaviour in the Tiwi communities and may provide inspiration for the rest of Australia in this regard.

Our study has highlighted the population groups most at risk and suggested factors likely to be associated with suicidal behaviour in the NT. The development of successful suicide prevention programs needs to consider the multifactorial nature of the issue and the unique environment of those most at risk.

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COMPETING INTERESTS

None identified.

AUTHOR DETAILS

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