Suicide Prevention

A review of evidence of risk and protective factors, and points of effective intervention

MINISTRY OF
HEALTH
MANATŪ HAUORA

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Disclaimer

In response to the increases through to the late 1990s in New Zealand's youth suicide rates, the *In Our Hands – New Zealand Youth Suicide Prevention Strategy* was developed, and launched in 1998. To support and inform the development and public discussion around that strategy, two reports were commissioned to review the evidence on suicide.[1]

Since the publication of the original review reports, there has been a substantial growth in the national and international literature on the subject of the causes and prevention of suicide, and explanations for the changing trends in suicide rates in the Western world – including New Zealand's. With the move towards an all-age approach to suicide prevention in New Zealand, and given the substantial growth in the literature, the Ministry of Health contracted an update review of the evidence to be undertaken.

During the preparation of the review, and the development of draft New Zealand Suicide Strategy – A Life Worth Living, it has become obvious that, as with many complex areas of health related study, the evidence for the causes and prevention of suicide is very diverse and subject to a lot of debate about which perspective has more merit than another, and where the focus for prevention should lie.

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[1] *A Review of Evidence: In Our Hands – the New Zealand Youth Suicide Prevention Strategy* by Annette Beautrais examined the evidence behind the approaches in *In Our Hands*. The second report, *A Review of Evidence: Kia Piki te Ora o te Taitamariki – the New Zealand Youth Suicide Prevention Strategy* was written by Keri Lawson-Te Aho and provided the basis for prevention of Māori youth suicide. These reports are available from the Ministries of Health and Youth Affairs and Te Puni Kōkiri.

Introduction

The extent of the problem

In recent years suicide has emerged as an important public health problem in many countries (Krug et al 2002). Internationally, approximately one million people die by suicide each year (WHO, 1999). In New Zealand almost 500 people die by suicide annually – more than die in road traffic accidents and homicides combined. Since 1950 there have been more than 17,000 suicides in New Zealand, and suicide is the second most common reason for death among youth and young adults aged 15–34 (NZHIS 2004). More positively, in the last five years (1998–2002) there has been a 25 percent reduction in the rate of suicide in New Zealand, from 14.3 to 10.7 per 100,000.

It has been estimated that there are from 8 to 25 times as many suicide attempts as suicide deaths (Moscicki 2001). Suicide attempts range in intent and medical severity from the mildly self-injurious to the determinedly lethal. More than 5000 people present to emergency departments in New Zealand each year with medically significant suicide attempts (NZHIS 2004). At a personal level, all suicide attempts, regardless of the extent of medical severity, are indications of severe emotional distress, unhappiness and/or mental illness.

Suicide and suicide attempts place a strong emotional burden on families and friends. There are also substantial economic costs associated with lives lost to suicide. These costs arise from bereavement by suicide, from the medical and mental health costs associated with suicide attempts, and from the burden to family and whānau who care for those who have made suicide attempts.

Although the personal, familial, social and economic consequences are serious, because suicide is a statistically rare event it is difficult to predict which *individuals* will die by suicide. This unpredictability is a problem because, while there is a broad international consensus that many suicide deaths are preventable, there are no clear ways in which it is possible to predict and prevent suicidal behaviour at an individual level.

To address suicide prevention many countries have developed, or are developing, national suicide prevention strategies to provide a framework for reducing the number of suicides and suicide attempts. In recent years the emphasis in New Zealand policy in suicide prevention has been almost exclusively in the area of youth suicide. This report contributes to work being undertaken to develop a comprehensive national suicide prevention strategy for people of all ages. The report provides an overview of risk and protective factors, and points of effective intervention, for suicide prevention in New Zealand, and provides a background and resource to inform the development of a national strategy.

An historical perspective

Suicide research has a long history (Goldney and Schioldann 2000; 2001; 2004) which has centred on a number of theoretical models which included sociocultural, psychological, psychoanalytic and moral perspectives. In the last two decades international research into suicide has increased exponentially. Much of this recent research has been developed in an atheoretical, empirical framework in which investigators have examined the role of likely causes and risk factors for suicidal behaviour. Recent contributions to knowledge about suicide have come from a number of disciplines including psychiatric epidemiology, behavioural genetics and injury prevention. These various historical and recent influences have contributed to, and shaped, the modern multi-disciplinary field of suicide intervention and prevention.

In the latter half of the 20th century knowledge about suicide was shaped by contributions from three disciplines in particular. Shneidman (1985) developed a psychological theory of the aetiology of suicide, suggesting that all suicides tend to share common psychological features. Of these, Shneidman regarded *psychological pain* or *psychache* as the single key common feature. He believes that suicide is the human response to extreme psychological pain, and that suicide prevention should focus on meeting the emotional needs of suicidal individuals.

A second contribution has come from research conducted in psychiatric epidemiology. This research has tended to explain suicide almost exclusively in terms of observed associations between a range of psychobiological risk factors and suicidal behaviour. In this respect, suicide research within the last few decades has followed trends in psychiatric epidemiology that have focused on the development of statistical models of risk and resiliency. These models have the capacity to integrate a number of different theoretical constructs that span biological, genetic, psychological, psychiatric and sociological factors.

A third line of research that is likely to assume an increasing importance in the explanation of suicidal behaviours has been provided by recent work in behavioural genetics. In particular, there is growing evidence from twin studies to suggest the genetic inheritability of suicidal behaviour (Statham et al 1998). Recent studies have identified a number of genetic and biological factors associated with suicidal behaviours (Mann et al 2001), and New Zealand research has demonstrated a gene-by-environment interaction (Caspi et al 2003). This research suggests that suicidal behaviours are not simply a response to environmental adversity, but reflect individual and genetically determined vulnerabilities to these behaviours.

A contemporary perspective on suicidal behaviour has come from the injury prevention field. This approach is based on the assumption that suicide can be conceptualised as a form of intentional injury.

Taken together, all of these considerations point to the need for a comprehensive and overarching theory that has the capacity to integrate genetic, individual, social, economic, psychiatric and psychological factors into a broad explanatory model of the aetiology of suicidal behaviours.

The different theoretical frameworks that have been developed to examine and explain suicide have, in turn, led to the development of different strategies for suicide prevention. Specifically, sociological and macroeconomic theories have led to an emphasis on population-level change in the social, economic and related structures that are believed to foster the development of suicidal behaviours. In contrast, mental health and psychiatric explanations of suicide have tended to focus on the better identification, treatment and management of psychiatric disorders as the primary route to suicide prevention. Finally, injury prevention perspectives have tended to focus on restricting access to the means of suicide.

In addition to these differing disciplinary emphases, there have been debates about different approaches to prevention. These debates have centred around the extent to which prevention is better delivered via universal, population-level public health interventions, or interventions targeted at high-risk populations.

The recent focus on a public health approach to suicide prevention has largely been motivated by parallels drawn between cardiovascular disease and suicide, pointing out that the prevention of cardiovascular disease became successful only when it moved from a clinical focus on treating high-risk patients who had already manifested the disease, to a population-based approach focusing on changing knowledge, attitudes, behaviours and cultural norms to prevent the development of cardiovascular disease in the population at large (Knox et al 2004). This approach of shifting the entire population distribution of risk is consistent with Rose's Theorem that 'a large number of people at small risk may give rise to more cases of disease than a small number at high risk' (Rose 1992). It is argued that suicidal behaviour and cardiovascular disease have in common a multifactorial aetiology, and that suicide prevention would, like the prevention of cardiovascular disease, benefit from population-based approaches aimed at changing attitudes, norms and behaviours which predispose people to suicide and other adverse outcomes with which suicide is linked (eg, substance abuse and violent, antisocial and offending behaviours).

It seems likely that most countries have, or will develop, national suicide prevention strategies which are placed within a public health framework designed to permit a broad range of social, economic, health, mental health, cultural and other risk factors to be integrated and targeted (Jenkins and Singh 2000; Jenkins 2002; US Department of Health and Human Services 2001). Further, current political ideologies appear to favour a public health framework for developing and implementing the types of policy changes that are seen as necessary to generate population shifts of risk factors to make an impact sufficient to reduce suicidal behaviour. Indeed, reductions in suicidal behaviour have been proven effective at a population level; for example, reducing population access to a particular means of suicide, coal gas, reduced both overall suicide rates and suicide rates by that method (Kreitman and Platt 1984).

Although it appears likely that public health approaches will dominate the area of suicide prevention, there is, nonetheless, a case for more targeted interventions. In particular, those individuals who make suicide attempts have emerged as an identifiable high-risk population that is characterised by ongoing mental health problems and high mortality (Beautrais et al 2000; Beautrais 2004a, 2004b). Pragmatically, population-based programmes will need to be supplemented by more targeted and intensive programmes for high-risk groups such as those making serious suicide attempts.

In summary, the theories, approaches and findings of sociology, philosophy, psychology, medicine, psychiatric epidemiology, public health, behavioural genetics and injury prevention have all made contributions to our current understanding of suicide. This short historical overview provides a background to the multidisciplinary approach that is required to understand what we currently know about the issues, causes and risk factors for suicidal behaviour, and the potential points of effective intervention to reduce and prevent suicide. However, the evidence supporting these perspectives has been variable, with most of the current knowledge about the causes and consequences of suicidal behaviour coming from epidemiological research conducted over the last two decades. The contents of this review inevitably reflect the extent and quality of evidence from these different perspectives.

Scope

For the purposes of this report, 'suicidal behaviour' is defined as any act of self-injury undertaken with the intent of harming oneself. Hence this review is limited to consideration of (completed) suicide, suicide attempts that do not result in death, and the behaviours sometimes referred to as parasuicide and deliberate self-harm. Parasuicide is defined as 'all intentional self-destructive behaviours … as long as these behaviours apparently are intended to bring about changes in the present situation through the actual or intended harm or unconsciousness inflicted upon the body' (Bille-Brahe et al 1994). Deliberate self-harm is defined as 'an act of intentional self-poisoning or self-injury, irrespective of the apparent purpose of the act' (Boyce et al 2003).

Explicitly excluded are high-risk-taking behaviours (eg, driving cars fast, smoking), where there may be a tangential risk of self-harm secondary to other intentions. Self-mutilatory behaviours are also excluded. The focus of the report is on suicide and suicide attempt, and (generally) suicidal ideation is not included in the review if ideation is addressed in the absence of suicide or suicide attempt.

This report has not attempted to review all published studies, but has focused on recent, relevant research, which is (substantially) that published in the English language after 1990.

Structure of the report

This report has been commissioned by the Ministry of Health to provide a literature review of the risk and protective factors and points of effective intervention for suicide and suicide attempt across all age groups and populations in New Zealand. The report is presented in five parts.

Part 1 looks at the epidemiology and recent trends of suicide and attempted suicide in New Zealand. Part 2 then looks at risk factors for suicide and attempted suicide, which is followed in Part 3 by a discussion of resiliency and protective factors for suicide and attempted suicide. Part 4 examines cultural issues considered in the development and implementation of a culturally relevant suicide prevention strategy in New Zealand, and Part 5 covers points of effective intervention to reduce and prevent suicide and attempted suicide. There is then a short final part (Part 6) drawing overall conclusions from the discussion.

1 Time Trends and Epidemiology

To provide background and context for the literature review, this section examines the epidemiology of suicidal behaviours in New Zealand, including time trends, gender differences, age differences, ethnic differences, and populations at increased risk of suicide and suicide attempt.

Time trends in New Zealand suicide rates, 1950–2002

Suicide rates were relatively stable from 1950 to the mid-1980s, then increased from the mid-1980s to the late 1990s (see Figure 1). Most recently, suicide rates have begun to decline from a 50-year peak of 14.3 deaths per 100,000 in 1998. The national suicide rate in 2002 (the most recent year for which data is available) was 10.7 per 100 000, representing a 25 percent reduction in five years. This reduction is paralleled by similar decreases in other countries (eg, Australia).

Figure 1:   New Zealand age-adjusted suicide rates, 1950–2002
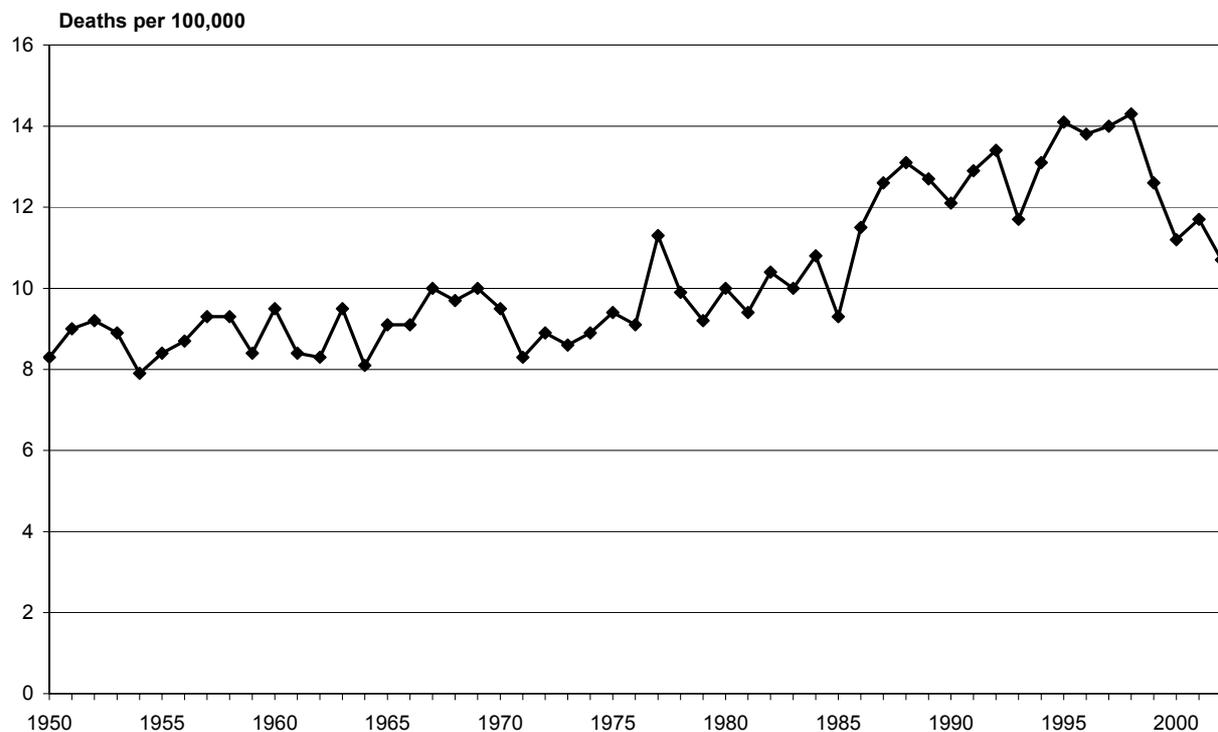
Note: 2002 data are provisional.

In New Zealand suicide rates for males showed a relatively steady increase from 1950 to the mid-1990s, then began to decline (see Figure 2). The male rate of suicide in 2002 was 16.6 per 100,000 compared to 13.3 in 1950. The increase in rates of male suicide is largely – but not wholly – explained by a rapid increase in rates of youth (ages 15–24) suicide that occurred after 1970. In contrast, the rate for females has remained low and relatively stable: 4.6 in 1950 and 5.2 in 2002.

Figure 2:   New Zealand suicide rates, by sex, 1950–2002
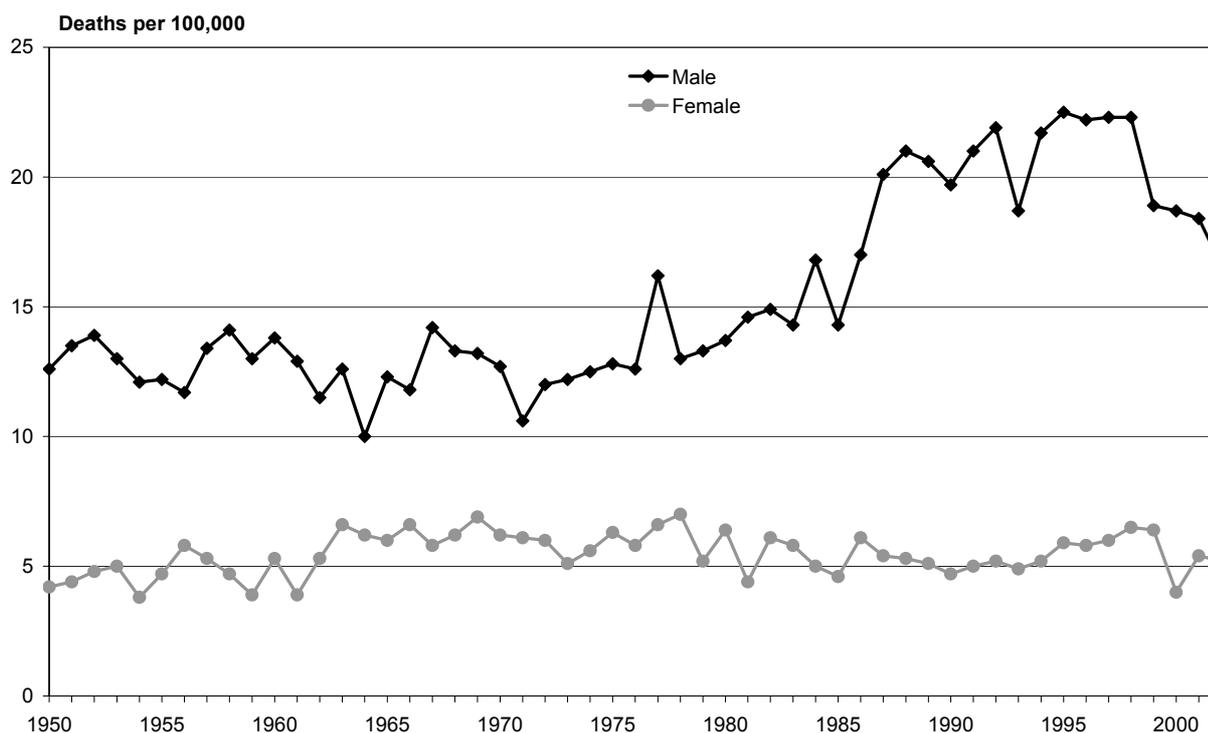
Notes: 2002 data are provisional; rates are annual age-standardised rates.

Rates of male youth suicide began to increase in the 1970s and then showed an abrupt increase over the period from the mid-1980s to the mid-1990s. However, since 1995 the male youth suicide rate has tended to decline (see Figure 3). The reasons for the rapid increase in male youth suicide rates in the mid-1980s are not known. It has been suggested that this increase reflects the effects of economic restructuring in New Zealand on the life opportunities of young males (Hassall 1997). However, this explanation is not consistent with the facts that, at an individual level, associations between economic factors and youth suicide rates tend to be relatively modest (Beautrais et al 1998c; Blakely 2002; Fergusson et al 1997, 2001), and youth suicide rates rose in many countries during this time, with increases occurring in countries that did not undergo the economic restructuring experienced in New Zealand. It is therefore unlikely that economic restructuring in itself is an adequate explanation, and more likely that the rapid increase in male youth suicide observed in New Zealand, and internationally, was the net consequence of a number of interacting factors (including increasing substance use, changing family structures, rising interpersonal violence, and changing economic and social opportunities), which combined to increase vulnerability to suicide among young males (Rutter and Smith 1995).

Annual numbers of female youth suicides are low, so this data warrants cautious interpretation. However, female youth suicide rates appear to be increasing at the same time that male youth rates are declining. In 1985 females accounted for 20 percent of youth suicides (ages 15–24); in 2002 32 percent of youth suicides were female.

Figure 3:   New Zealand youth (15–24 years) suicide rates, by sex, 1950–2002

Deaths per 100,000
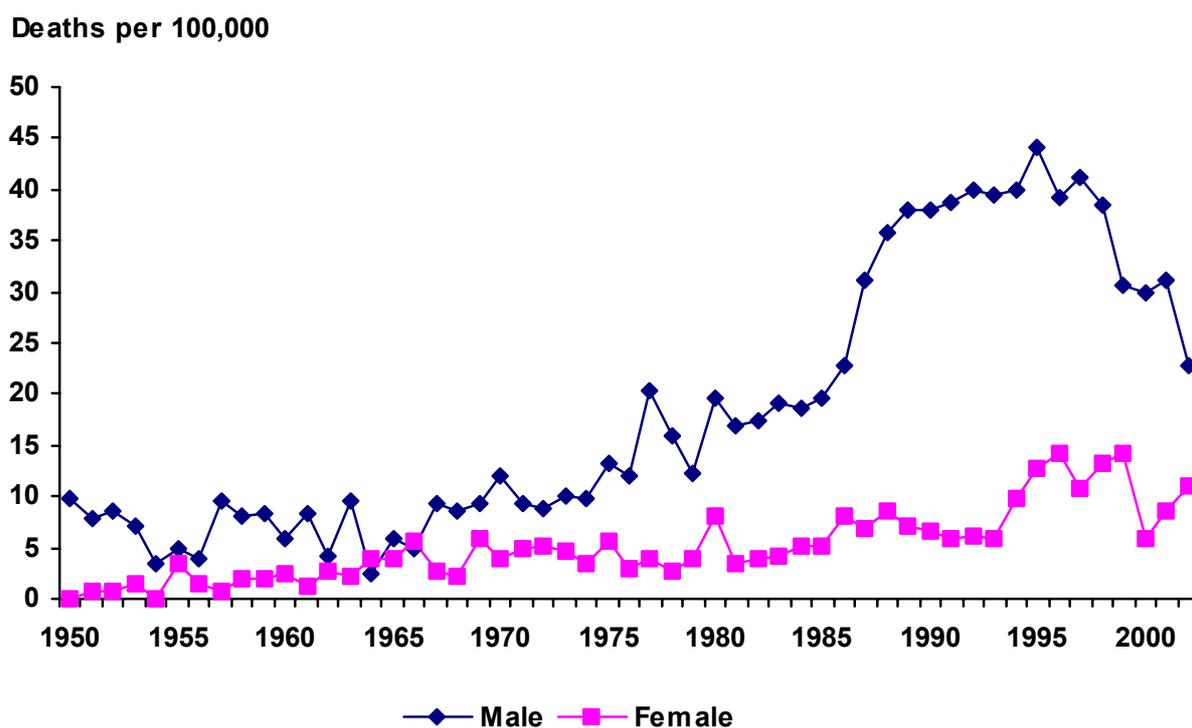
Note: 2002 data are provisional; rates are age standardised.

Gender differences

Males account for three-quarters of all suicide deaths in New Zealand. In 2002 76.1 percent (350/460) of suicides were male. The rate of suicide for females in 2002 was 5.2 per 100,000 (compared with 16.6 for males).

Age differences

Examination of age-specific suicide rates shows that from 1950 to 2002 suicide rates increased among youth (ages 15–24) and young adults (ages 25–44). In contrast, suicide rates decreased among adults in their middle years (ages 45–64) and in older adults (over age 64) (see Figure 4).

A more comprehensive examination of age differences in suicidal behaviours shows that, at present, suicide risk for males tends to increase up to age 20, remain relatively stable over the period from 20 to 39 years, decline to age 69, and increase thereafter (see Figure 5). Males aged 20–44 have the highest risk. Rates of suicide among teenagers are less than half the rates of suicide among young adult males (ages 20–24). Thus it is important to note that much of what tends to be described as 'youth' suicide is in fact suicide involving young adult males aged 20–44 rather than teenagers. For females, suicide rates tend to increase to age 24, remain relatively high to age 45, and tend to decline thereafter. In contrast to males, rates of suicide among females are similar for teenagers (ages 15–19) and for young adults (ages 20–24).

Figure 4: New Zealand age-specific suicide rates, 1950–2002

Age-standardised rate (per 100,000)
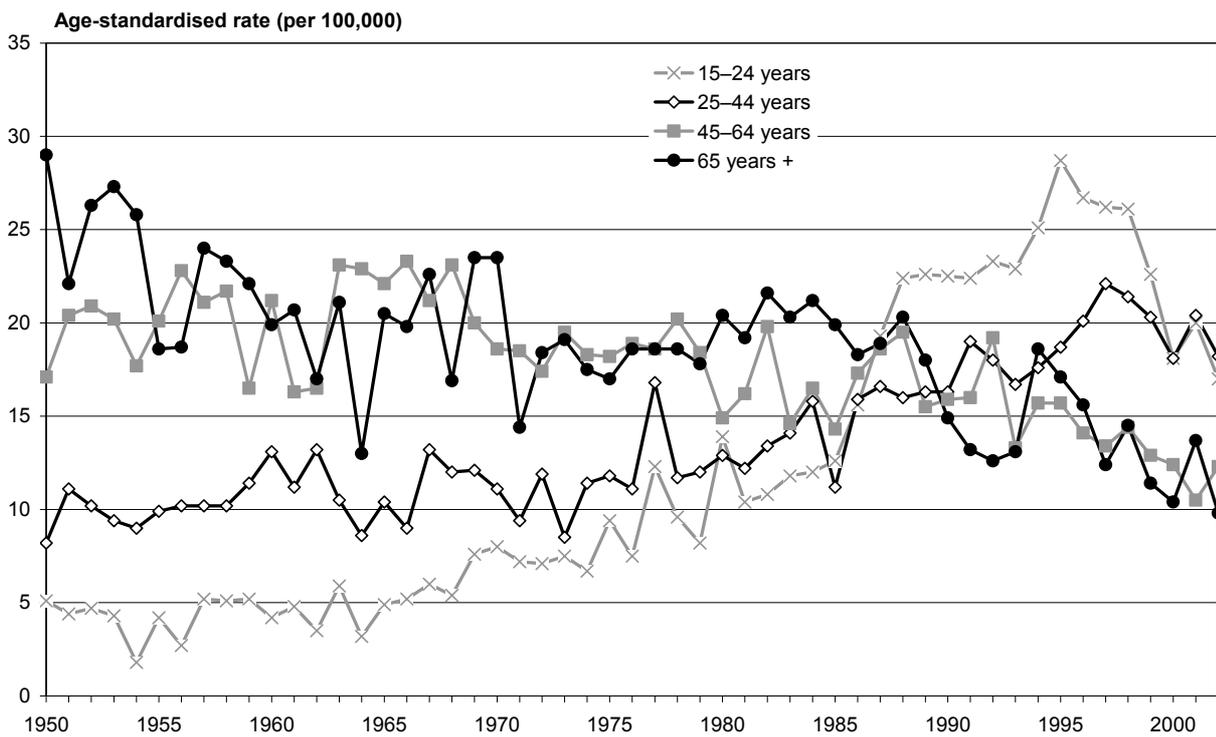
Note: 2002 data are provisional.

Figure 5: Suicide rates, by age and sex, New Zealand, 2002

Age-standardised rate (per 100,000)
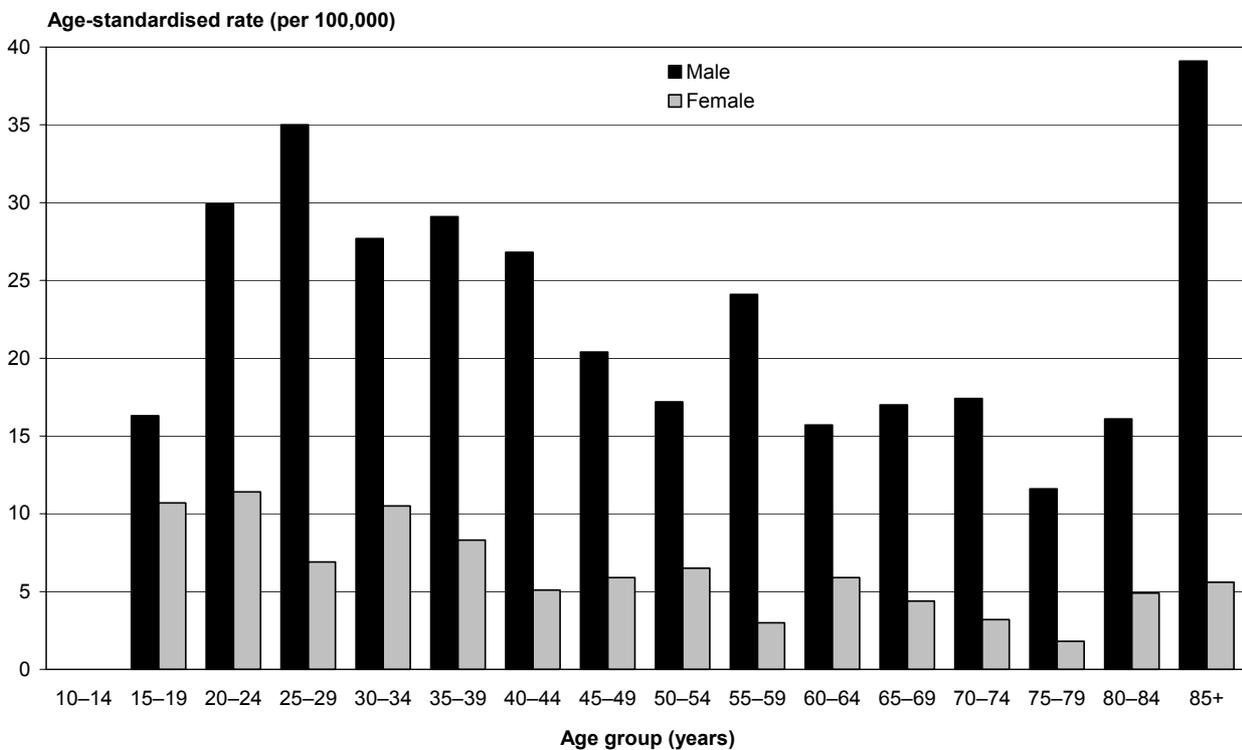
Note: 2002 data are provisional.

Suicide Prevention
A review of evidence of risk and protective factors, and points of effective intervention

Suicide contributes to mortality differently for different age groups. For both males and females the percentage of deaths attributable to suicide tends to increase up to ages 20–24, and then declines with increasing age (see Figure 6). After age 60 suicide accounts for an inconsequential proportion of all deaths. In contrast, suicide accounts for one-third of all mortality in men aged 20–34. In terms of contributions to age-specific mortality rates, suicide has its greatest impact on males aged 20–39 years, rather than on teenagers or older adults, suggesting that a major focus of suicide prevention should be on men in their 20s and 30s.

Figure 6:   Percentage of total mortality accounted for by suicide, by age and sex, 2001
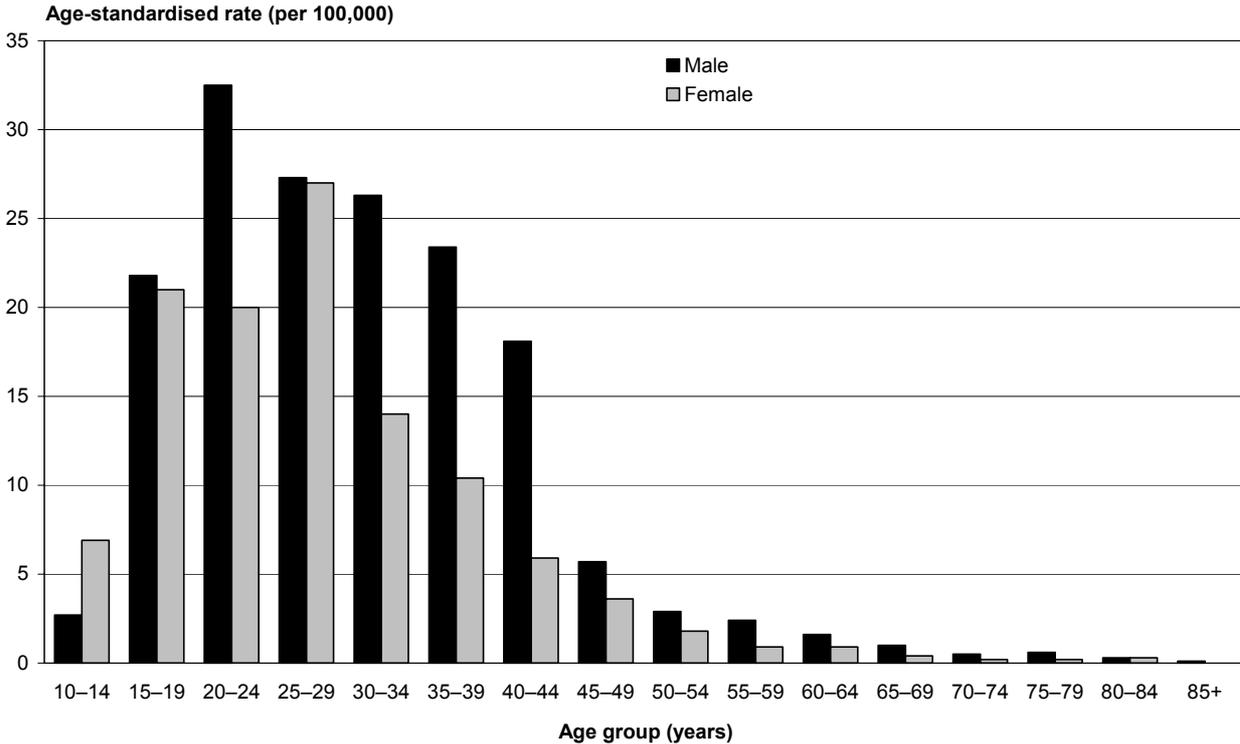
Major causes of death

Another way of illustrating the extent of the problem of suicide is by examining the status of suicide as a cause of death (see Table 1). In New Zealand, for the year 2000, suicide was the ninth leading cause of death overall, and ranked among the 10 leading causes of death for all New Zealanders except adults aged 65 and over. For youth and young adults aged 15–34 years, suicide was the second leading cause of death (after accidents), and for adults aged 35–44 suicide was the fourth leading cause of death (after cancer, heart disease and accidents).

Table 1: New Zealand leading causes of death, by age group, 2000

Ranking	Age group (years)							
	10–14	15–24	25–34	35–44	45–54	55–64	65+	Total
1	Accidents	Accidents	Accidents	Cancer	Cancer	Cancer	Heart disease	Heart disease
2	Cancer	Suicide	Suicide	Heart disease	Heart disease	Heart disease	Cancer	Cancer
3	Congenital	Cancer	Cancer	Accidents	Accidents	Respiratory	Respiratory	Respiratory
4	Nervous system	Undetermined	Heart disease	Suicide	Endocrine	Endocrine	Endocrine	Endocrine
5	Suicide	Congenital	Nervous system	Endocrine	Respiratory	Accidents	Nervous system	Accidents
6	Endocrine	Heart disease	Congenital	Respiratory	Suicide	Digestive system	Digestive system	Nervous system
7	Respiratory	Assault	Undetermined	Nervous system	Nervous system	Nervous system	Mental disorders	Digestive system
8	Infectious diseases	Endocrine	Endocrine	Infectious diseases	Digestive system	Suicide	Accidents	Mental disorders
9	Undetermined	Nervous system	Assault	Digestive system	Infectious diseases	Infectious diseases	Genitourinary	Suicide
10	–	Respiratory	Infectious diseases	Assault	Congenital	Musculoskeletal	Musculoskeletal	Genitourinary

Notes: Heart disease: any disease of the circulatory system, including cerebrovascular disease. Cancer: neoplasms. Infectious diseases: any infectious/parasitic diseases. Endocrine: endocrine, nutritional and metabolic diseases (eg, diabetes). Mental disorders: any mental or behavioural disorders, including organic disorders. Congenital: congenital malformations, deformations and chromosomal abnormalities. Nervous system: any disease of the nervous system (eg, epilepsy, demyelinating disorders, etc). Accidents: any death by unintentional injury. Digestive system: any disease of the digestive system (eg, liver, intestines, etc). Respiratory: any disease of the respiratory system. Musculoskeletal: any disease of the musculoskeletal system and connective tissue (eg, bone diseases, etc). Genitourinary: any diseases of the genitourinary system (eg, renal failure, etc). Undetermined: any event of undetermined intent.

Suicide rates by ethnicity

In New Zealand the determination of ethnicity of those dying by suicide was changed in 1995 (Ministry of Health 2001b; Statistics New Zealand 1998). Until 1995 ethnicity was based on an assessment of the individual's extent of Māori descent. Recognition of the limitations of this method of measurement led to a revision of data collection methods. Since 1995 ethnicity has been defined on the basis of the family's report of the individual's ethnic self-identification. This change in definitions led to a clear discontinuity in time-series data, and recognition that Māori suicide was likely to have been under-enumerated prior to 1995.

For both males and females, from 1996 through to 1998 Māori had higher rates of suicide than non-Māori (see Figure 7), but since 1999 Māori rates have tended to converge with those of non-Māori. However, in 2002 Māori male (19.7 per 100 000) and female (5.9) rates still remained higher than non-Māori rates (males 15.6; females 4.8). For Māori youth, suicide trends differ from those for the total Māori population. Both young male and female Māori have had higher rates of suicide than non-Māori each year from 1996 to 2001 (see Figure 8). Most recent data (2001) suggests that young Māori males (43.7 deaths per 100,000) and females (18.8) have significantly higher rates of suicide than their non-Māori peers (males 18.0; females 9.1).

Figure 7: Māori and non-Māori suicide rates, total population, by sex, 1996–2002
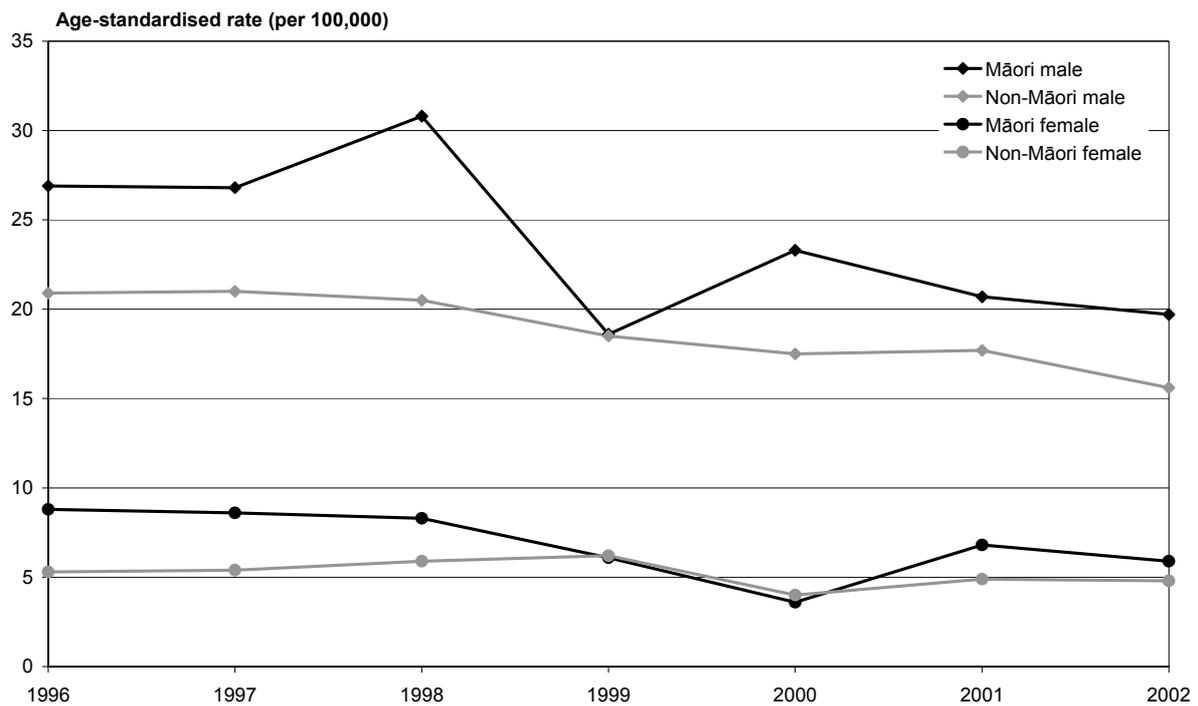
Note: 2002 data are provisional.

In 2002, 18 Pacific people died by suicide (14 males, four females), and there were 12 deaths (10 male, two female) of Asian people.

Figure 8: Māori and non-Māori youth (15–24 years) suicide rates, by sex, 1996–2001
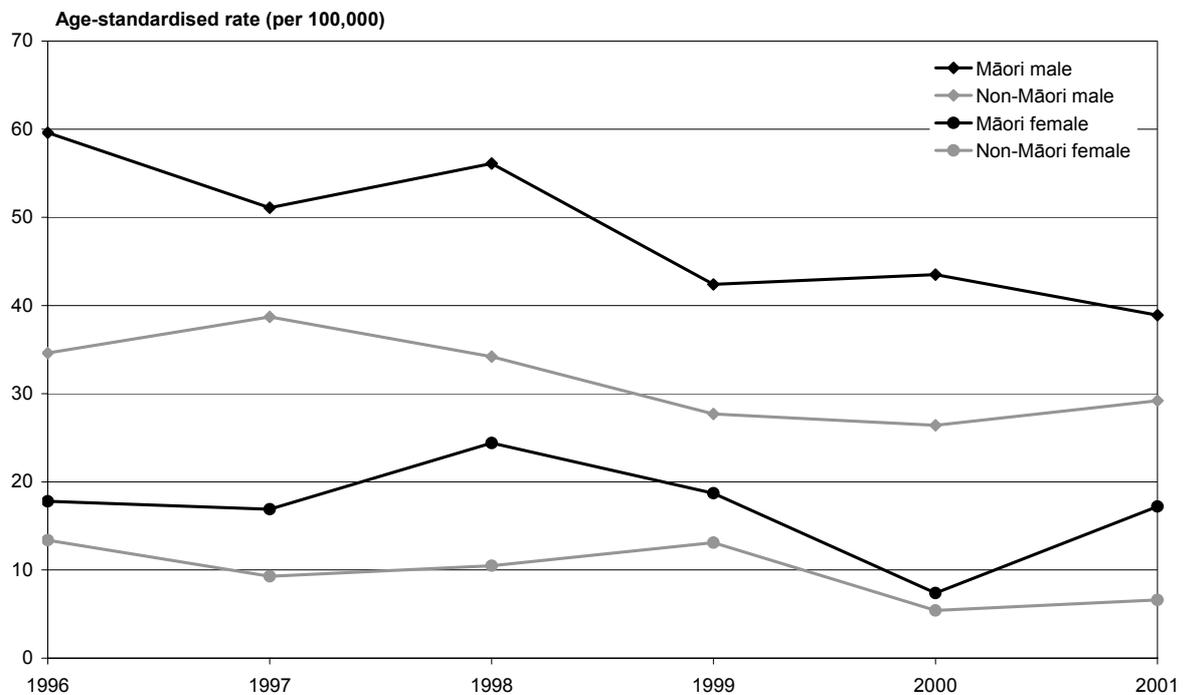
International comparisons of suicide rates

New Zealand suicide rates are often compared with rates for a series of industrialised, OECD countries (see Figures 9 and 10). The total male suicide rate in New Zealand in 2002 (16.6 per 100 000) was similar to that of Australia (17.5 in 2001) but less than that of Finland (26.5 in 2002). The female suicide rate for New Zealand (5.2 in 2002) was lower than the corresponding rate in Finland (8.1 in 2002).

Recent international comparisons of youth (aged 15–24) suicide rates show that young males in New Zealand (22.8 per 100,000 in 2002) (NZHIS 2004) ranked third after Finland and Ireland (Figure 11). The rate was significantly higher than corresponding rates in Australia, the United States and the United Kingdom (WHO).[2] The suicide rate for young females in New Zealand (5.2 in 2002) was lower than for Japan (8.8 in 2000), France (8.1 in 1999), Finland (8.1 in 2002), Sweden (5.9 in 2001) and Norway (5.4 in 2001 (Figure 12)).

Figure 9:   Total male suicide rates for selected OECD countries
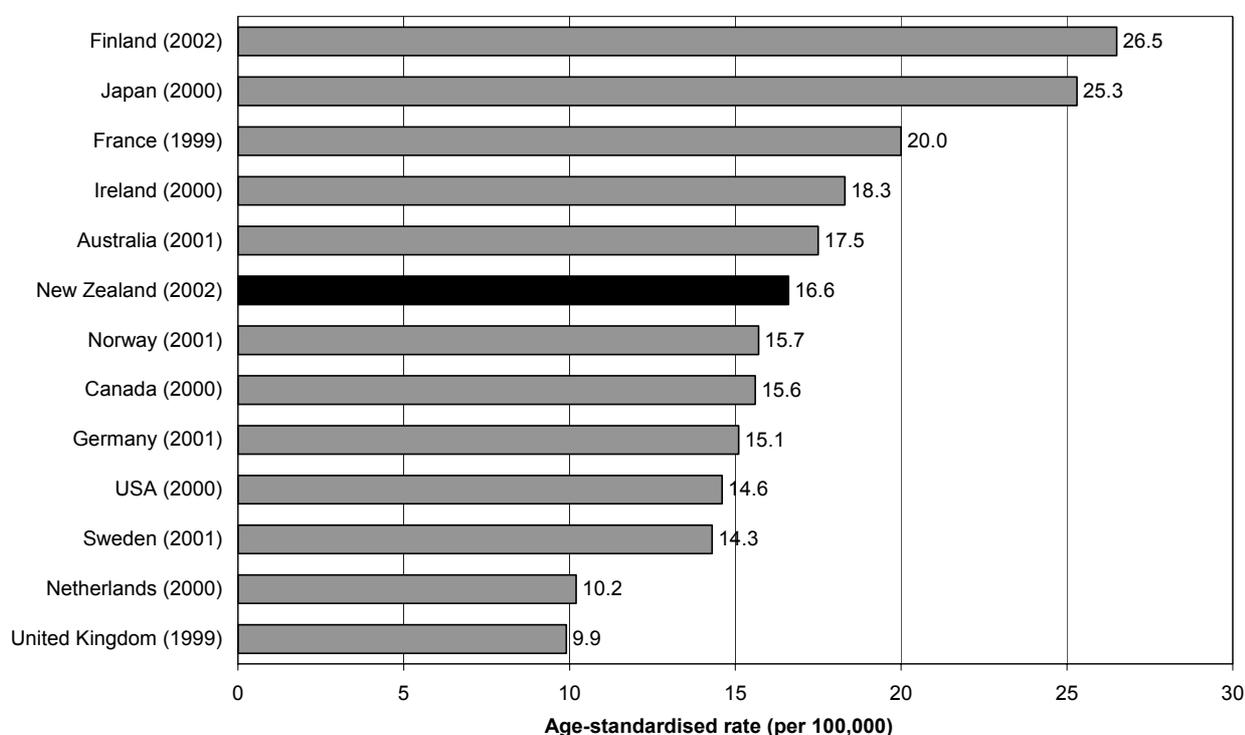
Source: NZHIS.

Note: Comparison years vary by country between 1998 and 2002; 2002 data are provisional.

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[2]   See http://www.who.int

Figure 10: Total female suicide rates for selected OECD countries
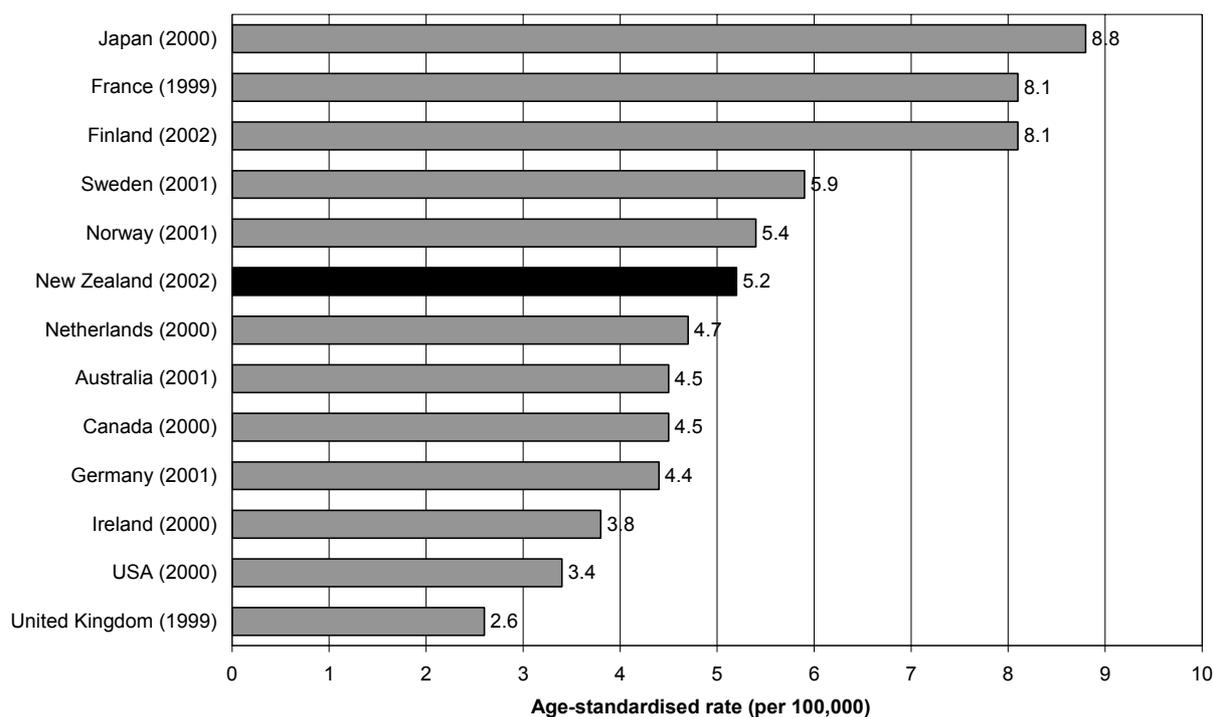
Country	Rate
Japan (2000)	8.8
France (1999)	8.1
Finland (2002)	8.1
Sweden (2001)	5.9
Norway (2001)	5.4
New Zealand (2002)	5.2
Netherlands (2000)	4.7
Australia (2001)	4.5
Canada (2000)	4.5
Germany (2001)	4.4
Ireland (2000)	3.8
USA (2000)	3.4
United Kingdom (1999)	2.6

Age-standardised rate (per 100,000)

Source: NZHIS.

Note: Comparison years vary by country between 1998 and 2002; 2002 data are provisional.

Figure 11: Male youth suicide rates (15–24 years) for selected OECD countries
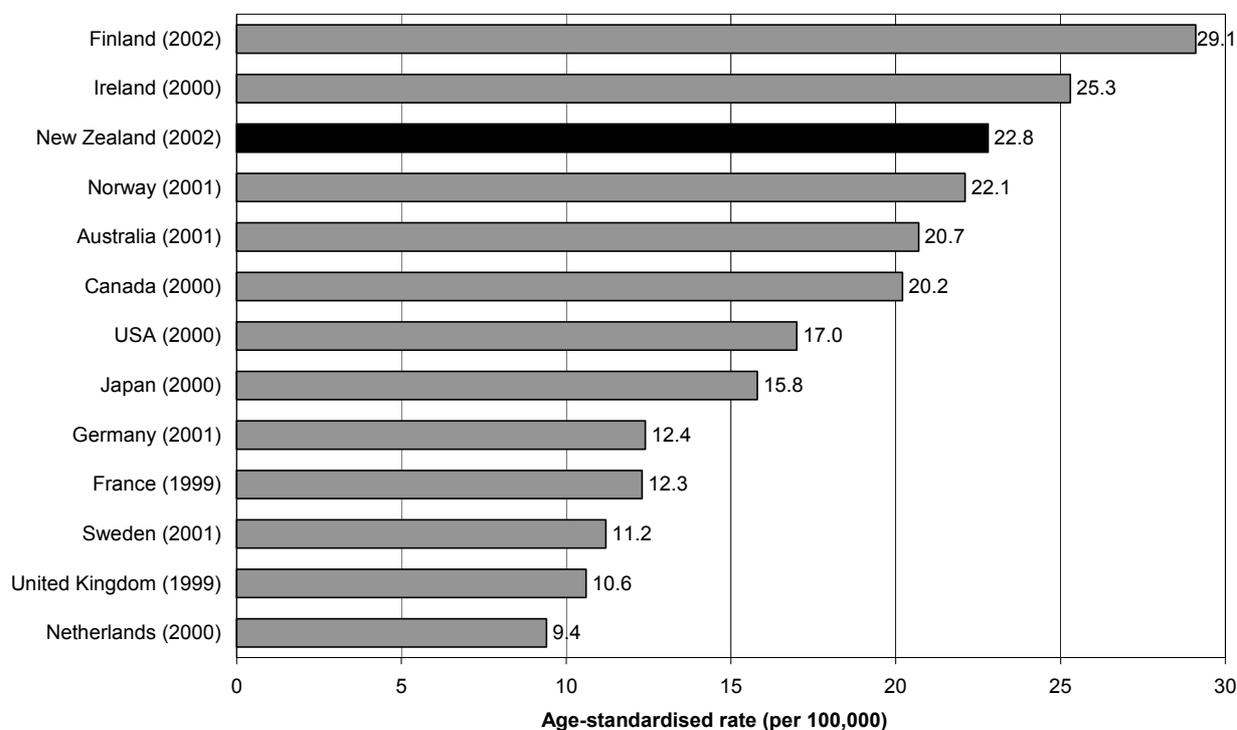
Country	Rate
Finland (2002)	29.1
Ireland (2000)	25.3
New Zealand (2002)	22.8
Norway (2001)	22.1
Australia (2001)	20.7
Canada (2000)	20.2
USA (2000)	17.0
Japan (2000)	15.8
Germany (2001)	12.4
France (1999)	12.3
Sweden (2001)	11.2
United Kingdom (1999)	10.6
Netherlands (2000)	9.4

Age-standardised rate (per 100,000)

Source: NZHIS.

Note: Comparison years vary by country between 1998 and 2002; 2002 data are provisional.

Figure 12: Female youth suicide rates (15–24 years) for selected OECD countries
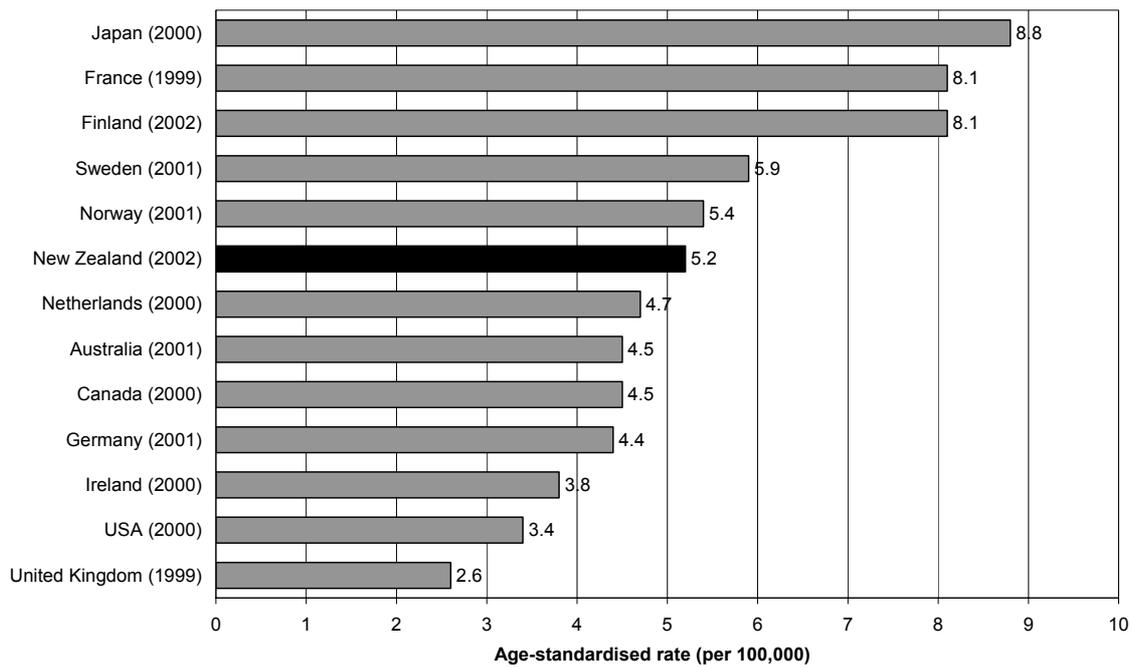
Source: NZHIS.

Note: Comparison years vary by country between 1998 and 2002; 2002 data are provisional.

Hospitalisation for suicide attempt

The total population rate of admission to hospital for suicide attempt and self-inflicted injury for 2001/02 in New Zealand was 128.2 cases per 100,000 (Figure 13). Rates of hospitalisation were twice as high for females (169.3 per 100,000) compared to males (86.8). They were highest among young people aged 15–24 years, with young females (aged 15–24 years) having the highest rates of hospitalisation (428.4) among all age and gender groups.

Figure 13:   Suicide and self-inflicted injury hospitalisation rate, 2001/02
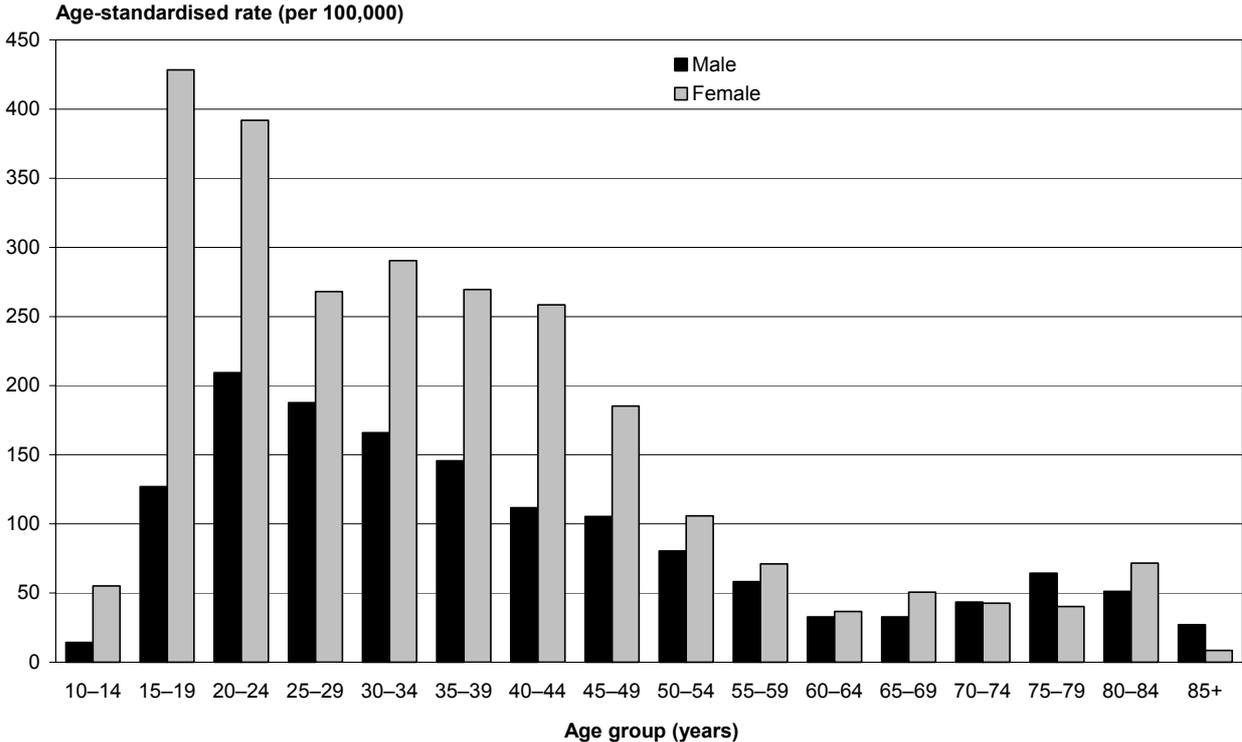
Trends in methods of suicide and suicide attempt

In 2002 the most common methods of suicide were hanging (46.5 percent of all suicides) and vehicle exhaust gas (by carbon monoxide poisoning, 21.5 percent), which together accounted for 68 percent of all suicides (see Figure 14). During the last two decades there has been a substantial increase in deaths by hanging and by vehicle exhaust gas and a significant reduction in the use of firearms (Beautrais 1999a). In 2002 firearms accounted for 10.7 percent of all deaths. For both young males and females (aged 15–24) hanging has become increasingly common, currently (2002) accounting for 64 percent of male and 60 percent of female youth suicides.

The dominance of hanging, and the ubiquitous availability of the materials and opportunities for carrying it out, suggest that there is limited potential to reduce suicides by restricting access to means of suicide (Beautrais 2000b). The clear policy implication of this observation is that suicide prevention in New Zealand needs to focus on a range of approaches designed to address the known risk factors for suicidal behaviour, rather than the immediately proximal issue of the method of suicide.

The methods for suicide and suicide attempt differ. While most suicides are accounted for by hanging and vehicle exhaust gas, most hospitalisations (over 80 percent) for attempted suicide are for self-poisoning (Weir and Ardagh 1998; Beautrais 1996; Gibb and Beautrais 2004).

Figure 14: Methods of suicide, by gender, 2002
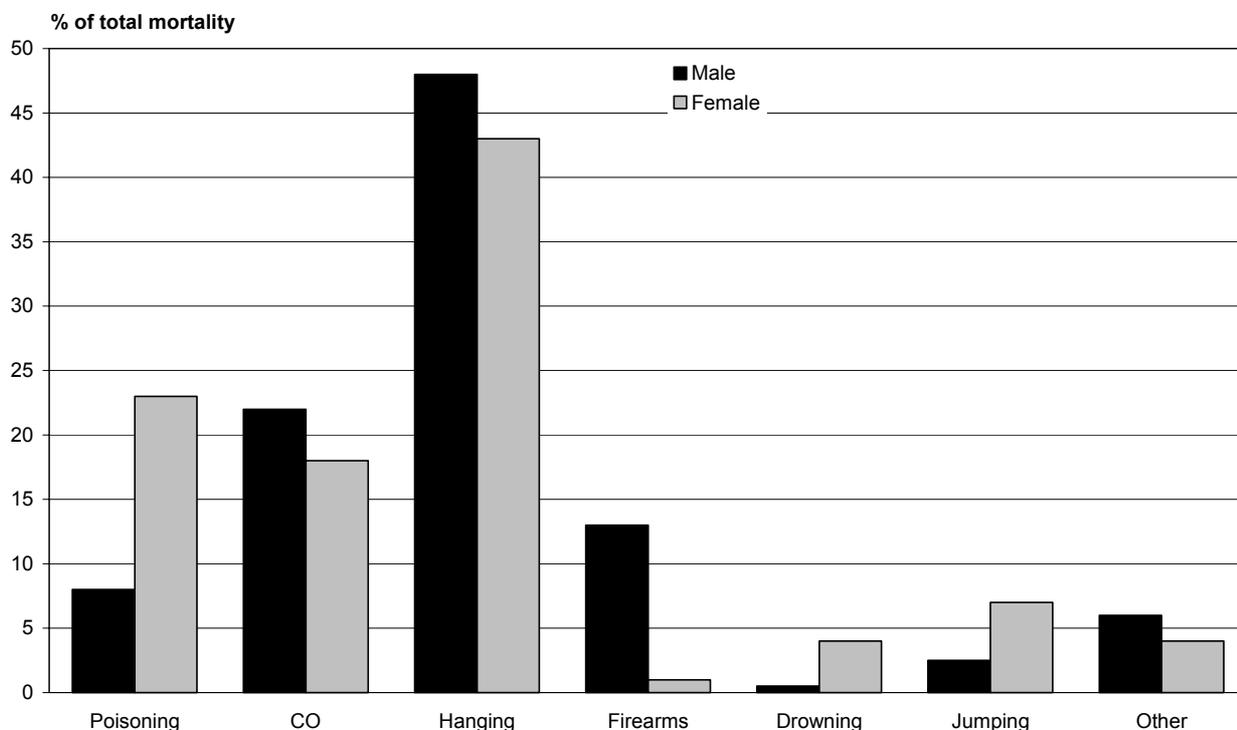
Populations at high risk for suicide and suicide attempt

There are several populations at high risk for suicide and suicide attempt, and these are discussed below.

Youth

As we have seen, in New Zealand rates of male youth suicide began to increase in the 1970s and then showed an abrupt increase over the period from the mid-1980s to the mid-1990s (Ministry of Health 2001b). During this time New Zealand male youth suicide rates were among the highest in a series of comparable developed OECD countries, which included the USA, UK, Australia, Canada, Japan and Finland.[3] Concerns about both New Zealand's high international ranking and the rapid increase in youth suicide rates led to a focus on youth suicide prevention, which generated the development of the New Zealand Youth Suicide Prevention Strategy (Ministry of Youth Affairs et al 1998).

Since the mid-1990s the male youth suicide rate in New Zealand has halved (from a peak of 44.1 in 1995 to 22.8 in 2002), although it still maintains a high international ranking. More

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[3] See http://www.nzhis.govt.nz

recently, New Zealand female youth suicide rates have begun to increase (11 per 100,000 in 2002).[4] These considerations suggest that youth remain a high-risk group for suicide prevention.

Māori children and youth

In common with other trends in mortality in New Zealand (Pōmare et al 1995; Public Health Centre 1995), Māori youth are at higher risk for suicide than non-Māori youth. Estimates suggest that in 2002 rates of Māori youth suicide were approximately twice those of non-Māori,[5] for both males and females. Accordingly, Māori children, adolescents and young people account for a disproportionately high fraction (35 percent in 2002) of suicides in those aged under 25 years (Beautrais 2001a). The reasons for the higher rate of suicide among young Māori are not clearly understood, but it has been suggested that it may be due to social and cultural inequalities that make Māori particularly vulnerable to suicidal behaviours (and to other poor health outcomes) (Blakely 2002; Durie 2001b).

Children who receive welfare care

New Zealand studies have identified children and adolescents who receive child welfare services as a population that has an elevated risk of suicide and suicide attempt compared with peers who do not receive such services (Smith and Beautrais 1999). What is more, Māori young people are over-represented in the welfare population. It is likely that the higher risk in this population results from their exposure to disadvantaged, dysfunctional and adverse childhood environments. This adversity gives rise both to subsequent suicidal behaviour (Beautrais 1999b; Fergusson et al 2000) and to the problems that account for their need for welfare services. A national programme to monitor and provide case management for suicidal and at-risk young people within the national Children, Young Persons and their Families Service (CYPF) has been developed (Child, Youth and Family 2005).

Older adults

Suicide research and prevention efforts in New Zealand have previously focused on youth. However, the progressive ageing of the population suggests that both absolute numbers and rates of suicide among older adults can be expected to increase. Findings from both New Zealand research (Beautrais 2002, 2004c) and international studies (Harwood and Jacoby 2000; Waern et al 2002) suggest that among older adults serious suicidal behaviour is attributable, in large part, to major depression. This observation implies a very strong focus for suicide prevention on the improved identification, treatment and management of depression, and better recognition of the physical health, life event, social, family and related factors that may contribute to the development of depression in this population. This clear, single focus for older adult suicide prevention contrasts with the approach needed to address suicide prevention in young people, where the multi-factorial nature of risk suggests a multi-compartmental approach to prevention activities (Beautrais 2003a).

Suicide attempts are more lethal in older adults for several reasons: the elderly are physically more frail and less likely to survive the physical sequelae of a suicide attempt; they are more likely to live alone and therefore to be not found in time for life-saving assistance to be given;

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[4] See http://www.nzhis.govt.nz

[5] See http://www.nzhis.govt.nz

they tend to choose more lethal methods of suicide, which may reflect a stronger intent to die; and they tend to make suicide attempts that are more carefully planned and implemented.

Efforts to develop suicide prevention approaches for older adults need to take into account a series of barriers to intervening with this population. These barriers include, for example, 'ageism', with suicide in older people more likely to be regarded as a rational and understandable decision by the general public, while youth suicide is seen as more tragic and more deserving of prevention. This view implies that there may be less public and political support for suicide prevention among older adults. This suggests that a comprehensive approach to suicide prevention among older adults needs to include education of the public and health care providers about features of healthy ageing, signs and symptoms of depression, and community and health care provision of supportive care.

Those who have made suicide attempts

Individuals who make non-fatal suicide attempts are at high risk of mortality from suicide and other causes (Beautrais 2004b; Ostamo and Lonnqvist 2001; Gibb et al 2005; Owens et al 2002; Hawton et al 2003; Hawton and Fagg 1988; Zahl and Hawton 2004). For example, a New Zealand study followed up 302 individuals who had made medically serious suicide attempts, and found that within five years 1 in 11 (9 percent) had died. Most deaths (60 percent) were by suicide (Beautrais 2004b), but there were also excess deaths from motor vehicle accidents. Another study of all individuals who were admitted to Christchurch Hospital for a suicide attempt of any type of severity found that within 10 years 1 in 20 had died by suicide (Gibb et al submitted). These findings are consistent with those from international studies. A recent systematic review of 26 studies found that those who make suicide attempts have a 0.5 to 2 percent risk of suicide within one year of their attempt, and a suicide risk in excess of 5 percent after nine years (Owens et al 2002).

In addition to elevated mortality rates, those who make non-fatal suicide attempts have high rates of further suicide attempt behaviour (Beautrais et al 2004a; Gibb et al 2005; Gairin et al 2003; Wang et al 1985). A study of patients admitted to Christchurch Hospital after a suicide attempt found that within 10 years almost one in three (28 percent) had made at least one further suicide attempt (Gibb et al 2005). A further study found that among those who made a medically serious suicide attempt 37 percent made at least one further attempt in the following five years (Beautrais 2004a).

In addition to higher rates of subsequent mortality and suicide attempt behaviour, those who make suicide attempts have significantly and consistently higher rates of psychiatric morbidity and an elevated risk of a range of poor psychosocial outcomes after an index suicide attempt (Beautrais et al 2000). In a Canterbury study, for example, within 30 months of a medically serious suicide attempt, almost half (44 percent) had been admitted to a psychiatric hospital, 40 percent of the sample met criteria for a substance-abuse disorder, 46 percent met criteria for depression, almost 60 percent reported relationship problems, 30 percent faced legal charges, 9 percent had at least one term of imprisonment, and almost three-quarters (73 percent) were social welfare beneficiaries at the time of at least one of the three follow-up interviews. These findings suggest that those who are admitted to hospital following a suicide attempt are a population at high and enduring risk for further suicidal behaviour and poor outcomes. They are a relatively readily identifiable group who require short-term crisis interventions and longer-term surveillance and management.

Those in custody and incarcerated

A series of reports has suggested that rates of suicide and suicide attempt are higher in individuals who are in custody or incarcerated (in prisons, jails and police cells) than in the general population (Bonner 1992; Hayes and Rowan 1988; Kerkhof and Bernasco 1990; Williams and Morgan 1994). In New Zealand, Māori are over-represented in prison populations, although among prisoners the risk of suicide is similar for Māori and non-Māori (Skegg and Cox 1993). Individuals who die by suicide in custody or prison tend to be characterised by a history of psychiatric disorder, including, particularly, depressive symptoms, substance abuse, antisocial behaviours and previous suicide attempts.

However, mental disorder, prior suicide attempts and substance abuse occur commonly in prisoners, making identification of those at risk of suicide in incarcerated populations difficult. Recent case control studies of suicidal behaviour in prison and/or custody have refined the characteristics, circumstances and factors that distinguish between prisoners who attempt suicide or die by suicide and those who do not. These factors include a history of suicidality, psychotic diagnosis, psychotropic medication, a highly violent index offence, and single-cell housing (Fruehwald et al 2004). These findings suggest there is a need to examine how serious psychiatric morbidity, including suicidal behaviour, is treated and managed within the prison population. In addition, the heterogeneity of the prison population and the difficulties this imposes in determining risk factors for specific groups within this population have been recognised (Haycock 1993; Morrison 1996), and imply the need for further research to delineate specific risk profiles for particular categories of individuals imprisoned and confined in police custody.

Those who are gay, lesbian or bisexual

During the last few years a number of studies of young adults and middle-aged males have shown that sexual orientation is a risk factor for suicidal behaviour, and that rates of suicidal ideation and suicide attempt are elevated among those who are gay, lesbian and bisexual (see, for example, Bagley and Tremblay 1997; Fergusson et al 1999; Herrell et al 1999; and for a review, McDaniel et al 2001). These studies have uniformly reported increased risks of suicide attempt and suicidal intent among those who are gay, lesbian and bisexual, with risk ratios ranging from 3.6 to 13.9 (Bagley and Tremblay 1997). A New Zealand study by Fergusson and colleagues (Fergusson et al 1999) found that, in addition to a six-fold increased risk of suicidal behaviour, those who were gay, lesbian or bisexual also had higher risk of mood disorders, substance-use disorders and anxiety disorders. In contrast, increased risk of *completed* suicide in this population has not been demonstrated (Rich et al 1986, 1988; Shaffer et al 1995). The failure to find links with suicide may be due to the fact that assessing sexual orientation following suicide is more difficult than ascertaining sexual orientation among those making suicide attempts, who can be personally interviewed.

Although the emergent research suggests clear links between sexual orientation and suicide attempt risk, studies in this area have traditionally faced difficulties, centring around the study of relatively small groups of gay and lesbian youth and issues relating to the accuracy of ascertaining gay, lesbian and bisexual orientation. As a consequence there is a strong need to develop a series of well-designed studies of large samples to replicate, extend and validate the evidence reviewed above.

Those who are socially isolated or excluded

Several studies have reported that social factors – including social isolation, living alone, having fewer friends, 'rootlessness' and a perceived lack of social support – are risk factors for suicidal behaviour (Appleby, Cooper, et al 1999; Heikkinen, Isometsa, Marttunen, et al 1995; Phillips et al 2002). More generally, a number of studies have reported that individuals who lead socially isolated lives are more vulnerable to suicide than those people with strong family affiliations and social support within the community (Heikkinen et al 1993, 1994; Kreitman 1977; Magne-Ingvar et al 1992; Maris 1969; Trout 1980). However, poor social support may be characteristic of those individuals who are vulnerable to suicide attempt because of their life course, rather than their being predisposed to suicide risk because of their lack of social support *per se* (Beautrais 2001b).

These findings are supported by a recent analysis by Kendler (1997), who suggests that individuals may, to some extent, generate their own social environments, which may reflect individual temperament and genetic predisposition to mental illness. Social support should not be regarded as an environmentally created measure in isolation from individual temperament and other personal characteristics. For males, alcohol abuse and alcoholism are likely to be important factors related to living alone and to interpersonal losses, providing a further reason for addressing substance abuse problems in males in efforts to prevent suicide (Heikkinen, Isometsa, Marttunen, et al 1995).

2   Risk Factors

In recent years international concerns about the problem of suicide have led to a dramatic increase in the volume of research about the causes and risk factors for suicidal behaviour. There is now a large volume of information from psychiatric, epidemiological, genetic and biological research that gives a generally coherent and consistent picture about the risk factors for suicidal behaviour.

This section examines risk factors for suicide and suicide attempts. To provide a framework for understanding these factors they are grouped into domains of conceptually similar factors.

Mental disorders

Mental disorders (in particular, mood disorders, substance-use disorders and antisocial behaviours) play the strongest role in the aetiology of suicidal behaviour. Psychological autopsy studies using youth, adult, all-ages, male and female samples have invariably shown high rates of mental disorder among those dying by suicide or making serious suicide attempts (for reviews, see Cavanagh et al 2003; Lonnqvist 2000), ranging from 81 percent to 100 percent (median, 93 percent) (Lonnqvist 2000). The approximately 10 percent of individuals who die by suicide without an axis I (Ernst et al 2004) diagnosis appear to have sub-threshold psychopathology, and are more similar to those who die by suicide with an axis I mental diagnosis than a control group. In controlled studies the prevalence of mental disorder in those dying by suicide or making serious suicide attempts ranges from 63 to 98 percent (Appleby, Cooper, et al 1999; Phillips et al 2002; Beautrais 2001b; Foster et al 1999; Molnar, Berkman, et al 2001; Beautrais, Joyce, Mulder, et al 1996; Lesage et al 1994; Cavanagh et al 1999a, 1999b; Cheng 1995; Swahn and Potter 2001; Kessler et al 1999; Vijayakumar and Rajkumar 1999). Odds ratios range from 1.8 to 38 (Molnar, Berkman, et al 2001; Beautrais, Joyce, Mulder, et al 1996).

Mood disorders

Mood disorders (including major depression, bipolar disorder and dysthymia) are the mental disorders most commonly associated with suicide and serious suicide attempt. Between 25 and 90 percent of those who die by suicide or make serious suicide attempts have a mood disorder (Lonnqvist 2000), with most studies reporting strong and significantly increased risks, with odds ratio (OR) estimates ranging from 11 to 41 (Beautrais, Joyce, Mulder, et al 1996; Molnar, Buka, et al 2001). The risk of suicide is increased 20-fold for those with major depression, 15-fold for those with bipolar disorder, and 12-fold for dysthymic individuals (Harris and Barraclough 1997). The lifetime risk of suicide for those with mood disorder is estimated at 4 percent (Institute of Medicine 2002).

The risk of suicide attempt or suicide depends on the severity of the depressive disorder. Suicidal ideation occurs in more than half of those with depression, and suicidal ideas, plans and attempts increase with the increasing severity of depression. The subjective (rather than objective) severity of current depression, together with higher levels of suicidal ideation and fewer reasons for living, has been shown to distinguish psychiatrically admitted patients who made suicide attempts from those who did not (Mann et al 1999). The risk of suicide is

increased in those with recurrent and/or chronic, compared to single-episode, depression (Beautrais 2002; Waern et al 2002; Goodwin and Jamison 1990).

As noted above, the risk of suicide is increased 15-fold in people with bipolar disorder (Harris and Barraclough 1997). From 25 to 50 percent of those with bipolar disorder make at least one suicide attempt (Goodwin and Jamison 1990), and the risk of suicide increases with increasing severity of the illness (Hagnell et al 1981), and appears to be higher in the first five years after diagnosis (Weeke 1979; Guze and Robins 1970). The risk of suicide for females and males with bipolar disorder is similar (Weeke 1979), in contrast to the higher male risk for the general population.

The central role of mental disorders, and notably depression, in the aetiology of suicide has been clearly articulated in a recent comment by Isacsson and Rich (2003) on issues of causality and treatment in this field:

> There is no argument against suicide representing a complex set of variables .... A fundamental discovery was made in the late 1950s (Robins et al 1959): the majority of suicides were committed by people with clinical depression. This finding has been replicated over and over again and we believe that many, like us, have concluded that this connection has been replicated enough to be proven. We have also presented evidence that suicides occur infrequently in people with depression taking antidepressant medication (Isacsson et al 1994). Thus, in spite of the 'extreme complexity' of the phenomenon of suicide, a simple and testable hypothesis can be stated: depression is a necessary cause of most suicides. Based on this proposition, it has been suggested that effective suicide prevention must focus on improving identification and treatment of depression in the population (Isacsson 2000). When we look at the declining suicide rates over the past decade or so, we see a great deal of support for that theory.

Substance-use disorders

Substance-use disorders (including alcohol, cannabis and other drug abuse and dependency) are linked with suicidal behaviour, with psychological autopsy studies suggesting that between 19 and 63 percent of those dying by suicide have a substance-use disorder, and controlled studies generating OR estimates ranging from 2.2 to 5.8 (Molnar, Berkman, et al 2001; Murphy 2000; Conner and Chiapella 2004). Substance-use disorders frequently occur comorbidly, often with depression and/or anxiety or antisocial disorders (Murphy 2000). Comorbidity is associated with increased suicide risk (Lonnqvist 2000; Beautrais, Joyce, Mulder, et al 1996; Kessler et al 1999).

More specifically, estimates suggest that the risk of suicide is increased six-fold for those with alcohol-use disorders (Harris and Barraclough 1997). The disinhibiting and facilitating effects of acute alcohol intoxication increase the likelihood of impulsive and aggressive suicide attempts. Population studies suggest that high national rates of alcohol consumption and low minimum legal drinking age are related to increased suicide risk (Wasserman et al 1998; Birckmayer and Hemenway 1999). Risk factors for suicide and suicide attempt in alcoholics tend to be the same as those for general population samples of suicides and medically serious suicide attempters (Conner et al 2003), implying that suicide prevention in alcoholics must include a focus on depression as well as substance abuse.

Substance-use disorders (predominantly alcoholism), although less common in older than younger suicide victims, nevertheless place older adults at increased risk of suicidal behaviour (Waern et al 2002; Clark and Clark 1993; Henriksson et al 1995; Waern 2003). Estimates suggest that between one-quarter to one-third of older adult suicide victims have a substance-use disorder.

Anxiety disorders

Anxiety disorders are found in 3 to 17 percent of those with serious suicidal behaviour. However, these are likely to be lower-limit estimates of anxiety disorders, since many studies have failed to ask extensively about anxiety disorders (Molnar, Berkman, et al 2001; Khan et al 2002). Anxiety disorders often occur comorbidly with mood disorders and substance-use disorders. In some studies, when the association between anxiety disorders and suicide is controlled for mood disorder, anxiety disorders do not make a significant contribution to suicide, suggesting that the observed association between anxiety disorders and suicide may reflect mood disorders that are frequently comorbid with anxiety disorders (see, for example, Beautrais 1998a). Findings from one series of studies suggest that anxiety disorders in older adults with suicidal behaviour tend to occur secondary to mood disorders and do not make an independent contribution to suicide risk (Waern et al 2002; Allgulander and Lavori 1993).

Panic disorder is associated with a 20-fold increase in risk of suicide attempt (Weissman et al 1989), and it has been estimated that 20 percent of those who die by suicide have this disorder (Schmidt et al 2000). Panic disorder that is comorbid with other mental disorders is associated with higher suicide risk than panic disorder alone (Schmidt et al 2000; Warshaw et al 2000). It often occurs comorbidly with depression, and it may be that depression develops as a response to panic disorder (Schmidt et al 2000).

The risk of making a plan for suicide, making a suicide attempt, and making an *impulsive* suicide attempt are increased for individuals with Post Traumatic Stress Disorder (PTSD) (Molnar, Berkman et al 2001; Kessler et al 1999; Kessler 2000). PTSD usually occurs comorbidly with depression, alcohol and drug abuse, and other anxiety disorders (Kessler 1995).

Schizophrenia

Controlled studies of suicide and attempted suicide suggest that between 6 and 19 percent (median 8 percent) of those with such behaviour have schizophrenia (Radomsky et al 1999; Pompili et al 2004). While schizophrenia occurs infrequently (estimated at 1 percent) in the general population, and may not make a large contribution to total population rates of suicide, among the population of those with schizophrenia the lifetime risk of suicide is estimated to be 4 to 10 percent (Tsuang et al 1992), and the suicide risk is 30–40 times higher than the risk in the general population (Harris and Barraclough 1997). Between 25 and 50 percent of all those with schizophrenia will make a suicide attempt.

The risk factors for suicide in those with schizophrenia include a previous suicide attempt; significant depressive symptoms; hopelessness; alcohol or other substance abuse; male gender; command hallucinations; poor work and social functioning; social isolation; being unmarried; recent loss or rejection; a poor quality of life; and a deteriorating illness course in those with high premorbid performance (Mortensen et al 2000; Kaplan and Harrow 1996; De Hert et al 2001; Meltzer and Okayli 1995).

Eating disorders

In a study of females with eating disorders, one in four had a history of suicide attempt, a rate four times higher than that for the general female population. Also, one in four reported current suicidal ideation (Milos et al 2004). In these people, suicidal ideation and risk of suicide attempt were associated with increasing comorbidity. Common comorbid disorders included mood and cluster B (antisocial, borderline, histrionic and narcissistic) personality disorders.

Personality disorders and traits

Personality disorders are associated with increased risk of suicide and suicide attempt, independently and comorbidly with axis I disorders (Baud 2005; Yen et al 2004; Mehlum 2001; Isometsa et al 1996). The lifetime risk of suicide for those with personality disorders has been estimated at 4 to 8 percent (Foster et al 1999; Isometsa et al 1996; Linehan et al 2000; Henriksson et al 1993). Personality disorders tend to occur comorbidly with at least one axis I diagnosis, commonly depression and/or substance-use disorder (Isometsa et al 1996). The personality disorders most commonly associated with suicide are antisocial personality disorder and borderline personality disorder (for reviews, see Baud 2005; Linehan et al 2000). Borderline personality disorder is linked with increased risk of suicide attempt and suicide, even when the self-injury criterion is excluded (Yen et al 2004; Yen and Siegler 2003; Brodsky et al 1997).

Histories of abuse are common in those with borderline personality disorder (Brodsky et al 1997), and childhood sexual abuse is a posited causative factor for borderline personality disorder (Gunderson and Sabo 1993; Paris 1998). Significant associations have been reported between measures of antisocial behaviour, including adult antisocial behaviour and antisocial personality disorder, and suicide (Beautrais 2001b; Kessler et al 1999; Linehan et al 2000). Frequently, antisocial behaviours occur comorbidly with depression and substance-use disorders (Beautrais 2001b; Beautrais, Joyce, Mulder, et al 1996; Kessler et al 1999).

Mental health factors

In addition to the mental disorders associated with suicide and suicide attempt, there are a series of related factors that are linked to risk of suicide and suicide attempt. These factors are discussed below.

Comorbidity

High rates of comorbidity (co-occurrence of two or more mental disorders) are found among those making suicide attempts or dying by suicide, with comorbidity commonly occurring between mood and substance-use disorders, and, in males, between depression, substance-use disorders and antisocial behaviour (Lonnqvist 2000; Beautrais, Joyce, Mulder, et al 1996; Lesage et al 1994; Cheng 1995; Kessler et al 1999). More than half of those dying by suicide or making serious suicide attempts have comorbid disorders (Beautrais, Joyce, Mulder, et al 1996; Kessler et al 1999). The risk of suicidal behaviour increases exponentially with increased number of comorbid mental disorders (Beautrais, Joyce, Mulder, et al 1996). Suicide risk is also increased in those with comorbid mental disorders and somatic disorders (Lonnqvist 2000), and (as noted above) in those with comorbid axis I disorders and personality disorders (Baud 2005).

Previous suicidal behaviour

Prior suicide attempts predict future suicidal behaviour. A significant proportion (between 17 and 68 percent, median 25 percent) of those who die by suicide have made previous suicide attempts, with OR estimates ranging from 3.6 to 31.7 (median 5.8) (Appleby, Cooper, et al 1999; Phillips et al 2002; Beautrais 2001b; Foster et al 1999; Molnar, Berkman, et al 2001; Beautrais, Joyce, Mulder, et al 1996; Lesage et al 1994; Cavanagh et al 1999a, 1999b; Cheng 1995; Swahn and Potter 2001; Kessler et al 1999; Vijayakumar and Rajkumar 1999). These findings have been reported for all ages and for both suicide and suicide attempt.

Older people who make suicide attempts are likely to have higher intent and to use methods of higher lethality, and are less likely to survive the physical sequelae of an attempt. As a consequence, the fraction of older people with histories of suicide attempt is likely to be smaller than for young and middle-aged populations. Nevertheless, a significant fraction of older people who die by suicide do have histories of suicide attempt (Rubenowitz et al 2001).

Longitudinal follow-up studies of individuals who have made a suicide attempt suggest that those who make attempts have a 0.5 to 2.0 percent risk of suicide within one year of the attempt, a suicide risk in excess of 5 percent after nine years (Owens et al 2002), and higher rates of death from other causes, including homicide, accidents and disease (Beautrais 2004a; Ostamo and Lonnqvist 2001; Hawton and Fagg 1988; Harris and Barraclough 1998; Pederson et al 1975; Beautrais 2003b).

Two general conclusions can be drawn here. First, the repetition of suicide attempt is common and rates of suicide are high. Second, prediction, from baseline characteristics, of either suicide attempt or suicide is poor. A possible reason for this is that the factors that determine subsequent suicidality may relate to treatment, life events, changes in social circumstances and mental health, which occur after the index suicide attempt and which cannot be predicted from baseline characteristics.

Prior care for mental health problems

A consequence of the link between mental disorder and suicidal behaviour is that many people making suicide attempts or dying by suicide will have a history of contact with medical, welfare and related services for mental health problems (Appleby, Cooper, et al 1999; Beautrais 2001b). These findings suggest that those who die by suicide and make serious suicide attempts are well known to services, and their attendance and admission provide opportunities for refining treatment and management approaches to minimise suicide risk. In particular, it has been estimated that more than 20 percent of suicides that occur shortly after people have been hospitalised with mental illness could be prevented (Appleby and Shaw 1999; Appleby, Dennehy et al 1999; Burgess et al 2000; Department of Health [London] 2001).

Increased risk with increasing age

A substantial body of research has repeatedly identified mental disorders as the strongest risk factors for youth suicidal behaviour (Beautrais 1996; Fergusson et al 1995b, 2000, 2003; Beautrais, Joyce, Mulder et al 1996; Beautrais et al 1996, 1999a; Beautrais 2000c, 2003c; Fergusson and Lynskey 1995a, 1995b), and for adult (Appleby, Cooper et al 1999; Beautrais, Joyce, Mulder, et al 1996; Beautrais 1998b) and older adult (Beautrais 2002) suicidal behaviour.

The contribution of psychiatric illness to suicide risk increases with increasing age (Beautrais 1998b).

Family history of suicidal behaviour

A family history of suicidal behaviour is associated with risk of suicide and suicide attempt (Beautrais 2003c; Cheng et al 2000; Brent and Mann 2005). Rates of suicide attempt are elevated in the family members of those who die by suicide, and in the families of those who make suicide attempts, after mental disorders are taken into account. These findings suggest that suicidality is transmitted within families, independently of psychiatric disorders (Brent and Mann 2005). Impulsive aggression may play a role in the transmission of familial suicidal behaviour since it is implicated in psychopathology, and in familially shared adverse environments (Brent and Mann 2005).

Psychological risk factors

Certain temperaments, personality traits, psychological vulnerabilities, and cognitive and coping styles may act as predisposing factors in suicidal behaviour. The common thread in these psychological constructs linked with suicidal behaviour is that they all predispose the individual to react in negative ways to perceived stressful situations.

In young people a wide range of psychological factors has been associated with increased risk of suicide and suicide attempt. These factors include low self-esteem, hopelessness, extraversion, neuroticism, locus of control, impulsivity and impulsive violent aggressivity, self-consciousness, social disengagement and cognitive rigidity (Fergusson et al 2000; 2003; Brent et al 1994; Shaffer et al 1996; Beautrais et al 1999b; Benjaminsen et al 1990; Colson 1972; Pallis and Jenkins 1977; Goldney 1982; de Wilde et al 1993; Kienhorst et al 1992; Pearce and Martin 1993; Spirito and Overholser 1991; Asarnow and Guthrie 1989; Carlson and Cantwell 1982; Kashden et al 1993; Smith and Crawford 1986; Diekstra et al 1995; Groholt et al 2000). Caspi et al (1996) have reported that temperament in three-year-olds predicts suicide attempt. Those children assessed as inhibited at age three and those judged to be 'under-controlled' at three were at increased risk of later suicide attempts.

In adults, the personality traits that have been associated with suicidal behaviours include hopelessness, neuroticism, anxiety, timidity, cognitive rigidity, impulsivity, aggression and a strong sense of personal independence (Beck et al 1990; Clark 1994; Conner et al 2001; Duberstein 2001; Harwood et al 2001; Beautrais 2001b, 2002). For older adults, suicidal behaviour tends to be characterised by such psychological traits as hopelessness, cognitive rigidity, poor adaptive functioning, low 'openness to experience' and a determinedly independent personal style (Duberstein 1995; Clark 1993; Farberow and Shneidman 1970). Such personality characteristics are generally regarded as 'fixed' attributes, which are relatively difficult to modify, implying that such traits may impede intervention efforts aimed at preventing suicide.

Hopelessness is strongly associated with suicidal ideation, suicide attempt and suicide (for reviews, see Abramson et al 2000; Weishaar and Beck 1990), and has been reported to be more strongly associated with suicide than depression (Beck et al 1993). Hopelessness is a strong predictor of suicide in follow-up studies of 5 to 10 years of inpatients, outpatients and suicide attempters (Beautrais 2004a; Beck et al 1985, 1989, 1990). Hopelessness appears to be a stable

psychological trait, which may be independent of depression, may persist despite remission of depression (Brent et al 1998; Rifai et al 1994) and may occur comorbidly with a range of mental disorders (Joiner et al 2001; Bonner and Rich 1991). High levels of hopelessness have also been shown to occur in successive episodes of depression (Beck et al 1985). These observations suggest that the extent of hopelessness should be assessed, and treated, independently of mental disorders.

Two temperaments, in particular, appear to be associated with suicide and suicide attempt in both youth and adults (Brent et al 1994; Apter et al 1995; Kotler et al 2001; Plutchik 1995). These are the type described as impulsive and/or aggressive, and the type described as 'neurotic', which includes depressive and withdrawn traits (Fergusson et al 2000, 2003; Beautrais et al 1999b). Individuals with aggressive and impulsive temperaments are at increased risk of suicide and suicide attempt (Fergusson et al 2000; Verona and Patrick 2000). In these individuals, suicidal behaviour may occur in the absence of a mood disorder (Apter et al 1995), and may be associated with antisocial behaviours and conduct disorder, alcohol and substance abuse, impulsive behaviour, high scores on measures of novelty-seeking, and histories of childhood adversity (Fergusson et al 2000, 2003; Verona and Patrick 2000).

Evidence from epidemiological, twin, adoption and proband studies suggests that both impulsive behaviour and trait impulsivity show familial or hereditary transmission (Meyer et al 2000; Young et al 2000; Eaves and Eysenck 1975; Loehlin 1982; Pederson et al 1988; Eysenck 1976; Willerman et al 1992; Ludwig 1994; Cadoret et al 1995; Bierut et al 1998; Iacono et al 1999; Kendler et al 1997). Other researchers have suggested that impulsivity may be one of the intervening factors between brain serotonergic activity and aggressive and suicidal behaviour (Mann et al 2001; Verona and Patrick 2000). Further research is needed to determine how impulsive/aggressive and novelty-seeking temperament interact with environmental stresses to increase the risk of suicidal behaviour.

Stress-diathesis models of depression posit that genetic factors, including temperament, influence individual responses to stressful events (Costello et al 2002; Monroe and Simons 1991). These models suggest that suicide risk is determined by the presence of mental disorder and a diathesis or trait-like genetically influenced predisposition to behave impulsively and aggressively (Mann et al 1999).

Recent research has examined the extent to which there may be genetic factors that shape individual differences in response to environmental stresses (Caspi et al 2003). A functional polymorphism of the serotonin transporter (5-HTT) gene was found to moderate the influence of stressful life events on depression. These findings suggest a gene-by-environment (GxE) interaction, in which an individual's way of responding to environmental stresses that occur in childhood and in adulthood is influenced by individual genetic makeup.

Neurobiological risk factors

In current suicide research there is a strong focus on the role of genetic and biological factors in the aetiology of suicidal behaviours (for reviews, see Mann et al 1999, 2001; Brent and Mann 2005; Mann 2003). As noted above, higher rates of suicide and suicide attempt are found in the families of individuals with suicidal behaviour than in the families of people without suicidal behaviour (Brent and Mann 2005; Brent et al 1988, 1994, 1996; Gould et al 1996, 1998; Garfinkel et al 1982; Grossman et al 1991; Roy 1983; Harkavy-Friedman et al 1987; Pfeffer et al

1994; Goodwin et al 2004; Waern et al 2003). This finding suggests that genetic factors are involved in suicidal behaviour.

This view is supported by adoption and twin studies. Adoption studies show an elevated risk of suicide in the biological relatives of adoptees who die by suicide compared with non-suicidal adoptees (for reviews, see Brent and Mann 2005; Roy et al 1997). Twin studies have found higher rates of suicidal behaviours in monozygotic twins compared with dizygotic twins (Roy et al 1991; Haberlandt 1965; Juel-Nielsen and Videbech 1970; Zair 1981). Using twin designs, studies have suggested that up to 45 percent of the variance in suicidal behaviour may be genetic in origin (Statham et al 1998; Roy et al 1997; Fu et al 2002). These heritability estimates for suicidal behaviour are similar to those for major psychiatric illnesses such as schizophrenia and bipolar disorder.

Serotonin system dysregulation is associated with increased risk of suicide and suicide attempt (independently of psychopathology), subjective severity of symptoms, and planned suicide attempts of high lethality (Institute of Medicine 2002; Mann 2003; Traskman-Bendz and Mann 2000; Asberg et al 1986; Brown and Goodwin 1986; Cocarro et al 1989; Mann et al 1986, 1996; Stanley and Stanley 1989; Malone et al 1996; Meltzer et al 1984; Arango et al 1995). Little is known, however, about the processes by which serotonin and suicidal behaviour might be linked. Initially it was thought that impulsivity or aggressive behaviour might be important intervening variables (Asberg et al 1986; Cocarro et al 1989; Mann et al 1986; Arango et al 1990; Kety 1986; Mann 1987). However, recent work suggests that low levels of serotonin may be linked to planned, non-impulsive, potentially lethal suicide attempts (Mann 1995). Low levels of serotonin may be associated, principally, with poor impulse control rather than suicidality *per se* (Plutchik 1995; Stein et al 1993), and this linkage may better explain the serotonin dysregulation observed in both suicidal and violent behaviour.

Altered transmission in the noradrenergic, dopaminergic, GABAergic and glutamergic systems may be associated with suicidal behaviour (Arango et al 1996; Klimek at al 1997; Ordway 1997; Ordway, Smith, et al 1994; Ordway, Widdowson, et al 1994). These findings are consistent with suggestions that chronic exposure to stressful events and to psychological stress lead to dysregulation of the norepinephrine-specific nucleus (Traskman-Bendz and Mann 2000; Mann et al 1986; Weiss et al 1994; Heim and Nemeroff 2001). In general, however, findings from these studies have been less consistent than those from studies of the serotonergic system. There is a need for further research of both the serotonergic system and the other neurotransmitter systems implicated in suicidal behaviour.

Childhood adversity

There are clear links between exposure to childhood adversity and risk of later suicidal behaviour among young people. Elevated rates of suicidal behaviours are found among young people from disadvantaged and dysfunctional family backgrounds, characterised by such features as parental separation or divorce, parental psychopathology, a history of sexual, physical and emotional abuse or neglect, impaired parent–child relationships and interaction, parental discord, and parental violent behaviour (Fergusson et al 2000; Silverman et al 1996; Brown et al 1999). These factors appear to convey an enduring vulnerability to the development of mood disorders, substance abuse and suicidal behaviour which persists into adulthood and older adulthood (for reviews, see Beautrais 2003a; Gould et al 2003; Shaffer et al 2001). In general,

experiences of childhood adversities tend to act cumulatively, with those most at risk of suicidal behaviour being characterised by multiple childhood adversities.

In addition to associations that have been found between specific childhood adversities, a series of studies has examined linkages between global measures of adversity and risks of suicidal behaviour. In general, increased risk of suicidal and suicide attempt have been found among young people exposed to family environments assessed as being globally dysfunctional or adverse (Beautrais 1996; Fergusson and Lynskey 1995a; de Wilde et al 1993; Adams et al 1994; Joffe et al 1988; Kosky et al 1990; Martin et al 1995; Rubenstein et al 1989; Slap et al 1989; Marttunen et al 1992). A New Zealand study found that risk of suicide attempt was higher in children from disadvantaged family backgrounds characterised by a composite score of childhood adversity, including socioeconomic disadvantage, parental histories of substance abuse or offending, parental marital discord or instability, compromised childrearing, and high residential mobility. Among these families, risks of suicide attempt increased with increasing adversity (Fergusson et al 2000; Fergusson and Lynskey 1995a).

On the assumption that there are causal links between exposure to family adversity and later suicidal behaviour, there are at least two causal routes by which this association may occur. First, the association may reflect a causal chain in which (a) exposure to family adversity leads to increased risks of adjustment problems and other difficulties in adolescence, and (b) adjustment problems and other difficulties in adolescence lead to increased risks of suicidal behaviour. Alternatively, exposure to childhood adversity may influence later susceptibility to suicidal behaviour by decreasing the individual's ability to cope with stresses or difficulties in adolescence. This issue has been examined in a prospective study (Fergusson et al 2000; Fergusson and Lynskey 1995a), which concluded that the weight of evidence favoured a causal chain explanation in which the major contribution of family factors to suicidal behaviour arose because of the influence of these factors on the individual's psychiatric and social functioning in adolescence.

For adults, compared with youth, early childhood factors appear to be less influential in risk of suicidal behaviours. The likely reason for this is that, with the passage of time, the effects of adverse childhood experiences become overlaid by other life experiences, resulting in earlier experiences playing a decreasing role in the aetiology of adult suicide. Nevertheless, older adults with serious suicidal behaviour tend to have histories of childhood adversity (including sexual abuse and poor paternal care), suggesting that early exposure to such adversity may confer enduring vulnerability for the development of mood disorders and suicidal behaviour.

The range of childhood adversity factors associated with suicidal behaviour overlaps heavily with the known risk factors for juvenile crime, substance abuse, mental health problems and other adverse outcomes for youth and adolescents (Rutter and Smith 1995). This suggests that the major life processes and pathways that lead to risk of suicidal behaviour are similar to those that lead to mental health problems and other adverse outcomes for young people, and implies that generic programmes that attempt to ameliorate childhood adversities may reduce the risk of suicidal behaviour specifically.

Psychosocial stresses

Suicidal behaviour is often preceded by exposure to stressful or adverse life events, especially events that involve shame, humiliation, loss, defeat or threat (Kienhorst et al 1992; Gould et al

1996; Rubenstein et al 1989; Apter et al 1993; Marttunen et al 1993; Rich et al 1991; Shaffer 1974; Adams et al 1994; Beautrais et al 1997; Brent, Perper, Moritz, Baugher, et al 1993; de Wilde et al 1992; Dubow et al 1989; Groholt et al 1998; Morano et al 1993; Pfeffer et al 1991, 1993; Shafii et al 1988; Wetzler et al 1996). Among young people, the most common life events are interpersonal losses or conflicts (usually relationship breakdowns) and, less commonly, legal or disciplinary crises. Young people with suicidal behaviour may also have been subjected to both a higher total number of stresses and to more severe stresses than their non-suicidal peers (Lesage et al 1994; Gould et al 1996; Rubenstein et al 1989; de Wilde et al 1992; Dubow et al 1989; Pfeffer et al 1991; Shafii et al 1988).

For adults, the key life events that increase risk of suicidal behaviour are interpersonal losses and conflicts (including marital separation, serious family arguments, unemployment, change of residence, retirement), financial problems and job problems (Cheng et al 2000; Beautrais 2001b; Heikkinen, Isometsa, Aro, et al 1995).

Some of the life events that precede serious suicidal behaviour appear to be generated by an individual's own behaviour. Specific life events (separation, serious family arguments, financial problems and unemployment) often appear to arise from problems with alcohol.

In older adults, health impairments, somatic illnesses and declining physical capacity play a role in precipitating suicidal behaviour, with some evidence that physical health problems play an increasingly influential role with increasing age, particularly for males (Rubenowitz et al 2001; Waern et al 2003; Szanto et al 1997; MacMahon and Pugh 1965; Guohua 1995). Family discord and conflict are also associated with increased risk of suicide in the old (over 65 years), and in the old elderly (over 75 years) (Rubenowitz et al 2001; Waern et al 2003). Family conflicts may arise in the context of ageing-related 'stressors', and older adults with poor coping and adaptive skills may be those likely to be more vulnerable to suicidal behaviour.

A further set of factors associated with suicidal behaviours in adults relates to various forms of social interaction. Those making serious suicide attempts are likely to be characterised by high rates of social isolation, feelings of loneliness, poor social support and lack of a close, confiding relationship (Beautrais 2001b). The extent to which the often poor social circumstances of adult and elderly suicidal individuals arise from their psychopathology (particularly, depression) and personality traits, and the extent to which it might be possible to encourage social participation by at-risk individuals, is an area in which further research is needed.

Social and demographic factors

Suicidal behaviour is influenced by a range of social and demographic factors.

Age

There are clear differences in rates of suicidal behaviours by age. For young people, the risk of suicide increases with increasing age after puberty (Groholt et al 1998; Brent et al 1999). Among youth (aged 15–24) suicide is most common among those aged 18 to 24 years (WHO 1999). Thus what is often described as 'youth suicide' (with the misperception that this is synonymous with teen suicide) might more accurately be described as suicide in young adults. In New Zealand, the risk of suicide is highest among men aged 20–44. In most countries suicide rates have always been highest among older adults (especially for those aged 75 years and older)

(WHO 1999). In New Zealand, however, the dramatic increase in the youth suicide rate in the mid-1980s meant that youth rates surpassed those of older adults and have remained higher ever since.

Suicide research and prevention efforts in the last two decades have focused on adolescents and young people. However, the progressive ageing of the population in the Western world, including New Zealand, means that both absolute numbers and rates of suicide in older adults are likely to increase as a consequence of the cumulative effects of longer life expectancy, pressure on health resources, and, perhaps, an increased fraction of the older population with physical illnesses and disabilities.

Gender

Gender plays a strikingly different role in suicide and suicide attempt. Females are more likely to make non-fatal suicide attempts, while males are more likely to die by suicide. In New Zealand this gender paradox exists across all ages, including youth (Beautrais 2002), and across ethnicities (Beautrais 2003d, 2003e). However, while males are more likely to die by suicide, when the spectrum of suicidal behaviours (including suicide attempt) in the population is examined, females emerge as being more prone to suicidal behaviour than males (Fergusson et al 2000; NZHIS 2004).

The association between suicidal behaviour and gender is thus paradoxical: although females show higher rates of suicidal behaviour, males more frequently die by suicide. The key to this gender paradox probably lies, largely if not wholly, with gender differences in choice of method for suicide attempt. Traditionally there have been marked differences in male and female choices of method, with females more often choosing self-poisoning and males more often choosing the more lethal methods of hanging and vehicle exhaust gas (Beautrais 1999a, 2000a, 2003c, 2003d). These findings have potentially important implications given the increasing use by females of highly lethal methods such as hanging and vehicle exhaust gas. Given that young females are more likely than males to make suicide attempts, if the trend for females to use more lethal methods continues there is the potential for female youth suicide rates to approach, or even exceed, those of males.

Ethnicity

In New Zealand, as in a number of countries, indigenous people tend to have higher rates of suicide and attempted suicide (see, for example, Kettl and Bixler 1991; Lee 2000; Skegg et al 1995; CDC 2003; Indian Health Service 1999). Suicide rates are higher among young Māori children, adolescents, and youth aged under 25 years than in their non-Māori peers. The elevated risk in Māori appears to be highest among young adult males and declines with increasing age, with this trend being particularly evident after the mid-40s (Beautrais 2003). Older Māori appear relatively protected from suicide compared with their non-Māori peers.

Marital status

Risks of suicide are elevated among males who are divorced, widowed or never married (see, for example, Heikkinen, Isometsa, Marttunen, et al 1995; Kposowa 2000; Luoma and Pearson 2002). However, many studies that have examined the association between marital status and

suicide have been conducted at an aggregate level and have failed to take into account the extent to which other factors, such as mental illness, may contribute to marital status.

Intelligence and level of education

In general, risks of suicide and suicide attempt are elevated among individuals who have poor or limited education (Beautrais 2001b; Lesage et al 1994; Gould et al 1996). It is likely that the major route by which poor education leads to suicidal behaviour is as a result of links between socioeconomic factors and mental health (Fergusson and Lynskey 1995a). In males, risk of suicide has been found to be inversely and proportionately related to scores on intelligence tests conducted in early adulthood, with those individuals scoring low on such tests being at increased risk of subsequent suicide (Gunnell et al 2005). This association might be mediated by educational attainment, which may influence occupational opportunities and income.

Religion

Religious affiliation and religious activity appear to protect against suicide, with higher rates of suicide among those without religious affiliation (Pescosolido and Georgianna 1989; Lester 2000; Maris 1981). It is likely that religious affiliation and religious activity exert a protective effect in a number of ways, including proscribing against suicide and promoting social links, with these links and prohibitions also decreasing the risk of psychiatric disorders (including depression, substance abuse, offending and antisocial behaviours) with which suicide is associated.

Socioeconomic status

Both aggregate-level and individual-level studies in different countries have suggested that lower social class and/or socioeconomic disadvantage are risk factors for suicide and attempted suicide (see, for example, Fergusson et al 2000; Beautrais 2001b, 2002, 2003c; Fergusson and Lynskey 1995a; Boxer et al 1995; Bucca et al 1994; Gunnell et al 1995; Platt and Hawton 2000; Beautrais et al 1998d; Lewis and Sloggett 1998; Johansson et al 1997). For example, recent research using the Danish longitudinal registers (Goldney 2004) has shown that low income increases suicide risk, but that this risk is substantially attenuated when mental illness is taken into account. Low income has a stronger effect on male rather than female suicide risk, suggesting that males are more disadvantaged by poor economic conditions than females. The findings from this study clearly suggest that associations between measures of social class and suicide risk are likely to be substantially overestimated if they are not adjusted for potential confounding factors, and for mental illness in particular.

Unemployment

Recently, considerable attention has been given to the role of unemployment as a factor that provokes suicidal behaviour. Strong claims have sometimes been made that changing employment patterns are responsible for changes in rates of suicide (see, for example, Morrell et al 1998). Both time-series analyses and case-control or longitudinal studies have tended to report associations between unemployment and suicide and attempted suicide with ORs for suicide and attempted suicide ranging from 3 to 29, and PARs ranging from 7 to 58 percent (for a review, see Platt and Hawton 2000). The wide range in these estimates is likely to be

accounted for by the extent to which individual studies controlled for the potentially confounding effects of psychiatric disorder and other factors.

In the prospective Christchurch Health and Development Study, unemployment was significantly related to increased risks of suicidal behaviour. After adjustment for confounding and reverse causality, this association was substantially reduced but remained significant (Fergusson et al 2001). Analysis of census data for New Zealand (Blakely et al 2003) found a two- to three-fold increased risk of suicide among those who were unemployed. The authors allow that about half of this association might be attributable to confounding by mental illness, and concede that their study does not provide strong evidence for a causal link between employment and suicide. There is a need for more large population studies using sophisticated statistical analyses to explore the nature of the association between unemployment and suicide.

Social change

The impact of social change and/or distress on suicide rates has been examined in a number of countries (for reviews, see Stack 2000a, 2000b; Eckersley and Dear 2002). Aggregate-level studies have suggested that measures of downward social mobility and indicators of national or regional economic decline are associated with increased risk of suicide (Breed 1963; La Vecchia et al 1994). Increased suicide rates have also been linked with higher female participation in the workforce, increased rates of alcohol consumption, and decreased rates of church attendance (Maskill et al 2004).

Disruptions of social ties are also linked to increased risks of suicide attempt. In New Zealand, Fergusson and Lynskey (1995a) found that young people with frequent (over four) changes of schools by age 16 were 3.3 times more likely to make suicide attempts than their peers without changes of school. Similar findings have been reported from the United States (Juon and Ensminger 1997).

In particular, there has been much conjecture in the popular media about the contribution of various social changes to recent increases in youth suicide rates. This issue was addressed in a book commissioned by Academia Europaea (Rutter and Smith 1995) to consider evidence on whether psychosocial disorders (including suicidal behaviour) among young people had become more or less prevalent in the last 50 years, and to explore causal explanations for any changes found. The authors observed that suicide rates among young males had increased since the 1950s at the same time that suicide rates among older adults were falling. The authors note that, despite considerable research, there were no clear explanations for this increase. However, they suggested that explanations for the increased youth suicide rates were likely to be found in increased rates of depression, and substance abuse. Other possible explanations suggested could be the role of antisocial behaviour, the influence of suicidal models within the family or in mass media, the increase in family conflict and decline in family support associated with changes in family structure, the effect of an extended period of social dependence, and the likely effect of changing societal circumstances in general.

Occupational group

A series of studies has identified particular occupational groups with increased risk of suicide. These groups include police, miners, those in the medical profession (doctors, nurses, pharmacists, dentists), farmers and veterinarians (Boxer et al 1995; Kelly and Bunting 1998; Kposowa 1999; Stack 2001; Hawton et al 1998; Langley and Stephenson 2001). However, not all studies identify the same occupational groups as having elevated risks, and these differences may reflect differences in the extent to which studies controlled for the potentially confounding effects of age, gender, marital status and related factors. In part, the elevated risk of some occupational groups may reflect their ready access to highly lethal methods of suicide and/or the stressful nature of their work. Nevertheless, the identification of high-risk occupations suggests that it might be possible to target suicide prevention efforts at those occupational or professional groups, or, at an organisational level, at companies employing large numbers of workers in high-risk occupations.

Urbanicity/rurality

There are complex relationships between suicide rates and urbanicity/rurality. These rates tend to be confounded by the effects of age, race and gender, but often these effects are not taken into account in urban–rural analyses of suicide data (see, for example, Qin, 2003; Frances, 1986; Presbyterian Support Services 1989; Middleton, 2003; Caldwell, 2004; Singh, 2002). In general, in Western societies rates of suicide tend to be higher in rural compared to more densely populated regions. Taking other factors into account, living in rural areas tends to decrease suicide risk for females but increase suicide risk for males. Explanations for higher rates in rural areas may lie with the greater availability of firearms, poorer access to mental health and emergency medical services, higher rates of mental and physical illness, stressful life situations (eg, the impacts of rural economic downturns), greater stigmatisation of those with mental health problems, and reluctance to seek help.

Social factors relevant to suicide prevention in New Zealand

In New Zealand the Ministry of Health has been particularly interested in the extent to which specific health outcomes may be determined by social and economic conditions. Against this background, the Ministry commissioned a series of reports specifically to examine the extent to which recent suicide trends in New Zealand have varied in relation to changes in a range of socioeconomic factors (Collings et al 2005). Given their relevance, the major findings and conclusions from these reports are summarised below.

A selective review of sociological literature summarised the social, economic, cultural and other population-level influences on suicide that have been described in the international literature (Maskill et al 2004). A large number of possible influences were explored. However, high consistency among studies was found only for the association between mental illness and suicide, supporting the findings of New Zealand studies in this area. Inconsistent results were found for an effect on suicide for population fertility rates, differences in urban and rural suicide rates across countries, education levels, income inequality, unemployment rates, female labour-force participation, periods of economic expansion, crime, homicide and violence, and the quality and availability of mental health services.

The literature review concluded that some of the social and economic indicators showing *possible* associations with increases in suicide rates supported the relevance to suicide of reduced social integration and social constraint as a characteristic of society. However, it appeared that it was not the absolute characteristics of society within this type of domain, but rather the pace and extent of social change and the life trajectories of particular subgroups of the population within changing macrosocial circumstances that were especially relevant to observed patterns in suicide rates internationally.

A second study examined associations between changes in social factors that could be seen as markers of aspects of New Zealand society and changes in suicide rates (Collings et al 2005). This study found that suicide rates increased overall during the same period in which markers of social change also changed, in generally consistent directions. The markers investigated were marriage rates, female labour-force participation rates, decreasing fertility rates, crime violence and homicide, and immigration patterns. The economic indicators explored were unemployment rates, the economic business cycle and income inequality. However, no simple association was found between any of these factors and suicide rates in New Zealand. The authors concluded that their observations provided only a modest degree of support for the notion that change in social conditions in general might be linked with changes in suicide rates.

A third study compared economic contextual factors and changes in suicide rates in New Zealand and Finland and examined institutional arrangements and policy conditions that may have contributed to differences in suicide rates among young men in these countries (Howden-Chapman et al 2005). The two governments dealt differently with a major economic recession in the late 1980s and early 1990s. In the decade prior to the recession New Zealand's welfare state changed to a 'safety net' model, whereas Finland maintained a more comprehensive approach. In New Zealand during the 1980s and 1990s income inequality increased whereas in Finland it did not. However, this study failed to provide evidence that the divergent policies of the two countries had different impacts on male youth suicide rates.

One study explored the explanatory frameworks used by Māori leaders in Māori mental health practice and theory to explain suicide (Hirini and Collings 2005). The key explanatory domains were rapid social and intra-group changes in social values and norms, and in gender roles; the influence of modern international 'youth culture'; alienation from both 'traditional' Māori culture and social institutions and from mainstream society; poor self-concept among Māori, and Māori youth in particular; and the re-emergence of Māori cultural identity and its dynamic nature in a changing world. Mental illness, prominent in the Pākehā psychiatric discourse on suicide, was not a prominent theme. The authors argued the importance for suicide prevention of better integrating the socio-cultural and mental health models of suicide.

The final study explored the relationship between trends in suicide rates and a range of socioeconomic indicators in New Zealand, during four intervals: 1981–84, 1986–89, 1991–94 and 1996–99 (Ferguson et al 2003). These intervals span a period of rapid macrosocial change in New Zealand, during which there was deregulation of the financial sector, reorganisation of the state sector, introduction of a flattened tax system, privatisation of major utilities, user charges for government services and a restructured labour market. The study found that unemployment increased risk of suicide two- to three-fold compared with being employed, but suggested that about half of this association might be attributed to mental illness (Blakely et al 2003).

Although the authors of this series of reports found only one clear linkage (between unemployment and suicide), they concluded that all the studies suggested that social factors are relevant to suicide. They argue that these findings provide evidence that suicide prevention cannot be left entirely to clinical interventions. They allow, however, that it is not clear from their studies, or from international studies, what social-level interventions, if any, will have a demonstrable and specific effect on suicide rates, either at a population level, or in specific sub-groups.

3   Resiliency and Protective Factors

Although much recent research into suicidal behaviours has focused on exploring risk factors, there has been growing interest in 'protective factors' and 'resiliency' (for youth suicide in particular). This interest has been motivated by the observation that many people with exposure to risk factors do not develop suicidal behaviours. For example, of those with depression, only a minority develop suicidal behaviour (Fergusson et al 2003). Such observations suggest that there may be a range of protective factors that act to mitigate the effects of exposure to risk factors.

A focus on resiliency to suicidal behaviour has also arisen from (a) the view that risk factor research is overly negative, and/or (b) the belief that solutions to the problem of suicide can be addressed by discovering factors that contribute to the resiliency of people to adversity. This argument has been applied to youth suicide in particular. These assumptions have led to the development of a literature which has made strong claims about the ways in which various factors may contribute to resiliency to suicidal behaviour in young people (Borowsky et al 1999, 2001; Blum et al 2003; Guiao and Esparza 1995).

However, despite the appeal of this literature (Borowsky et al 1999), there has been relatively little research directly focusing on resiliency and suicidal behaviour. Many of the factors suggested as protective factors for suicidal behaviour have been speculative, or have been extrapolated from research in other fields. There has also been a confusing lack of clarity and consistency in the language used. For one thing, the factors cited as resiliency factors have often appeared to be merely positive ways of describing risk factors. For example, in a study of youth, 'connectedness with parents' is cited as protecting against suicide attempt (Blum et al 2003). Yet 'connectedness with parents' may be viewed as a positive description of the quality of parent–child relationships, whereas 'poor parent–child relationships', a well-recognised risk factor for suicidal behaviour, is perceived as being a negative term. Thus there has been a growing literature that tends to imply that the study of resiliency and protective factors is, in some way, more effective and insightful than the study of risk and vulnerability (Borowsky et al 1999; Resnick et al 1997; Resnick 2000; Quinn 1999; Davis 1999).

Recently there have been several important reviews of resilience which trace the history of research in this field and which clearly define the various concepts used (Luthar and Cicchetti 2000; Luthar et al 2000; Luthar 2003). 'Resilience' is defined as 'patterns of positive adaptation in the context of risk or adversity'. 'Resilience ... requires two fundamental judgements: (1) that a person is "doing okay", and (2) that there is now or has been significant risk or adversity to overcome' (Masten and Coatsworth 1998, quoted in Masten and Powell 2003). Luthar also makes it clear that 'resilience' is not a personality trait, but, rather, a description of a general pattern of behaviour. 'Competence' is defined as 'a track record of effective performance in developmental tasks that are salient for people of a given age, society or context, and historical time' (Masten and Coatsworth 1998). The issues of how competence should be defined, and by whom, and appropriate definitions in different cultural settings, are still matters for debate (Luthar et al 2000; Masten and Coatsworth 1998; Rutter 2000; Luthar 1999; Masten 1999, 2001).

Within this resiliency framework, risk and adversity are viewed as threats to the development of competence. Studies of resilience have tended to take either a 'variable-based' approach or a 'person-based' approach (Masten and Coatsworth 1998; Masten 2001). Variable-based approaches examine links between competence, adversity and potential protective factors (Masten and Powell 2003). Person-based approaches focus on identifying people who meet criteria for resilience, and whose life histories and individual characteristics are then studied, often by contrasting them with people with similar exposure to adversity who have suffered relatively poor outcomes.

These reviews of resilience in children and young people have consistently identified three classes of individual and contextual protective factors which characterise resilient individuals:

- *individual attributes* – including cognitive abilities (eg, IQ scores, executive functioning skills), self perceptions of competence (eg, self-esteem), temperament and personality (eg, adaptability, sociability), self-regulation skills (eg, impulse control) and positive outlook on life (eg, hopefulness)

- *relationships* – including quality of parenting, close relationships with competent adults (eg, parents, relatives, mentors), connections to pro-social peers

- *community resources and opportunities* – including good schools, connections to pro-social organisations (eg, religious groups), neighbourhood quality, and quality of social services and health care (Masten and Powell 2003).

These qualities may all be viewed as resources that counterbalance adversity or moderate the impact of risk factors or adversity on selected outcomes.

It is useful to look at the ways in which these definitions can be applied to suicide research. Thus exposure to a set of factors may be seen as increasing vulnerability to suicidal behaviour. Exposure to sexual abuse during childhood, for example, may increase the risk of later suicidal behaviour in those who are depressed. The alternative position is that those who are depressed but do not become suicidal are 'protected' by factors that increase their resiliency to suicidal behaviours. These arguments are, to some degree, interchangeable. For example, if social support and social connectedness contribute to resiliency to suicidal behaviour among those who are depressed, then the absence of social support and connectedness may be described as conferring vulnerability to suicidal behaviour when depressed. However, the ways in which factors are conceptualised and measured could favour a particular interpretation. For example, it may make more sense to describe exposure to childhood sexual abuse as increasing vulnerability to suicidal behaviour than to describe an absence of exposure to sexual abuse as conferring resiliency to suicidal behaviour.

An alternative approach is to propose models in which the vulnerability or resiliency factor acts interactively with the exposure variable; for example, depression. In their analysis of the aetiology of depression, Brown and Harris (1978) proposed a distinction between vulnerability and provoking factors, and argued that depression develops only in those who are exposed to both vulnerability factors and provoking factors. This argument may be used to explain the aetiology of suicidal behaviour by suggesting that depression is a provoking factor that encourages the onset of suicidal behaviour in those who are vulnerable to this behaviour.

Rutter (1985) has proposed a similar interactive model, in which protective factors are those that are beneficial to individuals who are exposed to a risk factor but that confer no (or less) benefit to those who are not exposed to the risk factor. This argument may be used to explain suicidal behaviour by suggesting that protective factors are those that mitigate against the development of suicidal behaviour in those who are depressed, but have no or less effect on those who are not depressed.

A recent New Zealand study has attempted to address some of these issues using data gathered during a 21-year longitudinal study of a birth cohort of over 1000 young people (Fergusson et al 2003). This analysis identified a series of factors that acted to exacerbate or mitigate risks of suicidal behaviour among young people with depression. These factors included a family history of suicidal behaviour, childhood sexual abuse, neuroticism, novelty-seeking, self-esteem and peer affiliations. Positive configurations of these factors (no family history of suicide, no childhood sexual abuse, low neuroticism, low novelty-seeking, high self-esteem and absence of deviant peer affiliations) increased resiliency to suicide attempt, whereas negative configurations of these factors acted to increase vulnerability to suicidal behaviour. These findings suggest that factors relating to the experience of childhood trauma, family factors, personality factors, and the nature of peer relationships may act in ways that either exacerbate or mitigate risks of suicidal behaviours.

The factors that some researchers have suggested provide protection against the development of suicidal behaviours (Borowsky et al 1999, 2001; Blum et al 2003; Guiao and Esparza 1995) are consistent with the broad model of resiliency described in the recent major reviews outlined above (Luthar and Cicchetti 2000; Luthar et al 2000; Luthar 2003). These factors include adaptable temperament, good self-esteem and good problem-solving skills (ie, *individual attributes*); a good emotional relationship with at least one person in the family (ie, *relationships*); good social support and social network; positive school experiences; and spiritual faith (ie, *community resources and opportunities*) (Borowsky et al 1999, 2001; Guiao and Esparza 1995). In New Zealand, Bennett et al (2002) conducted a qualitative study of 27 young people attending an Auckland emergency department following a suicide attempt. This study suggested that the factors contributing to recovery after suicide attempt included seeking help from professionals and peers, practical problem-solving skills, thinking positively, and a will to live.

In contrast to the current interest about protective factors in youth suicide, there has been relatively little research interest in the role of protective factors for suicide among adults. An exception to this has been research examining the links between suicide risk, marriage and children (Hoyer and Lund 1993). This research suggests that marriage protects against suicide for males (Qin et al 2003; Hoyer and Lund 1993; Hawton 2000), but that for females, being a parent rather than being married is a protective factor that minimises risk of suicidal behaviour. Religious affiliation and participation in religious activities appear to protect against suicide, presumably by proscribing against suicide and activities (such as alcohol abuse) that are precursors to suicidal behaviour, and by promoting social linkages (Pescosolido and Georgianna 1989).

Studies of older adult suicide suggest there is a range of potential protective factors, including:

- a confiding, supportive relationship
- social support, social connectedness and social interaction, including participation in organisations
- having a hobby
- good coping and adaptive skills
- good physical and mental health
- adequate pain relief
- good palliative care, and treatment of depression for those with terminal illnesses
- early, adequate and sustained treatment and management of depression
- strong religious and/or spiritual values
- adequate support following bereavement
- recognition of, and respite from, family discord and conflict
- restricted access to means of suicide, especially guns, for older adult males (Waern et al 2002, 2003; Rubenowitz et al 2001; Conwell 2001; Pearson and Conwell 1995; Szanto 2003; Caine and Conwell 2001).

In New Zealand, among Māori, age exerts a protective effect, with suicide risk markedly lower among Māori aged 45 and older than among younger Māori and among non-Māori adult peers. Further research is required to explore the specific factors that confer protection against suicide among older adult Māori.

More generally, the limited research evidence suggests that social attachments and social obligations may form important protective factors against suicidal behaviour. Relatively little research has focused on identifying individual, family and community factors that may protect against the development of suicidal behaviour, although interest in this issue has recently increased.

The considerations outlined in this section suggest that the issues of vulnerability and resiliency to suicidal behaviour are very complex and should take into account both the conceptualisation of measurements and models of the pathways linking risks of suicidal behaviour to other factors. It cannot simply be assumed that a 'positive' way of looking at the issue (via resiliency) is preferable to a 'negative' perspective (via vulnerability), or vice versa. There is a need for more research which focuses on resilience and protective factors for suicidal behaviour in adulthood. There is also a need for integrative research that looks at interactions of multiple protective factors, and for research that incorporates genetic and biological factors into vulnerability and resiliency models.

4 Cultural Issues

Rates of suicide in New Zealand provide compelling evidence that cultural issues are related to suicidal behaviour. For example, compared to their non-Māori peers, Māori youth (male and female) are over-represented in suicide and suicide attempt statistics, while older Māori appear to be protected from suicide. These observations suggest that a New Zealand suicide prevention strategy must include, as a major objective, measures to reduce inequalities in suicidal behaviour for a range of populations defined by age, gender and ethnicity. This section examines a series of cultural and related issues that might be considered in developing and implementing a national suicide prevention strategy, and in conducting research about suicidal behaviour with Māori, Pacific peoples, and other ethnicities relevant to New Zealand.

Māori

A national suicide prevention strategy needs to be designed to be consistent with Māori needs and expectations, to improve Māori health and to promote Māori development. This involves using the Treaty of Waitangi to underpin the strategy, taking action to reduce ethnic disparities in rates of suicidal behaviour, and employing the Māori concepts of hauora, whānau and whānau ora. In particular, the Treaty relationship between Māori and the Crown is based on three principles:

- partnership (working with Māori communities to develop appropriate health promotion and health maintenance authorities)

- participation (involving Māori in the development and implementation of a national strategy, and relevant service delivery)

- protection (ensuring health and social disparities and inequities are minimised).

The development of a national suicide prevention strategy requires consideration of the cultural context of Māori and the meaning associated with identifying as Māori. There is considerable diversity in identity, acculturation and lifestyle among Māori and it cannot be assumed that all Māori people who are suicidal are similar in terms of the personal meaning they associate with being Māori, nor can it be assumed that such personal meaning contributes to suicidal behaviour.

Culture plays a significant role in the manifestation of illness (Durie 1977, 1998). In particular, specialist Māori input should be sought around issues of identity for tangata whaiora (Māori consumers), protocol (eg, for post-mortems), and preoccupations with a sense of failure on cultural grounds (for issues relating to loss of individual or collective mana for suicide attempters, or for those bereaved by suicide).

Explanations for suicidal behaviour among Māori are often sought beyond psychiatric illnesses, in the realms of socioeconomic disparities and intergenerational disadvantage (Durie 2001a, 2001b; Hirini and Collings 2005; Lawson Te Aho 1998). Recognised risk factors for suicidal behaviour (poor socioeconomic status, educational disadvantage, exposure to violence and abuse, disruptions in family whānau during childhood and adolescence) may be compounded for some Māori by a history of tribal dispossession and trauma. Traditional roles for Māori as a collective culture involved leadership or protection, and guardianship of tribal resources and social groups. Stress and reduced capacity or access to traditional sources of coping with

problems may result in Māori being overwhelmed by the demands of modern society, without a clear sense of purpose, particularly if there is a belief that Māori have been marginalised.

Given this historical context, and taking into account diversity among Māori, development of a suicide prevention strategy for New Zealand needs to consider the following issues:

- the need to work within the framework of the Treaty of Waitangi to address issues for Māori, and, particularly, to reduce health and socioeconomic inequities

- the need to develop prevention and treatment services that are responsive to the needs of Māori (this may mean provision of both mainstream and kaupapa Māori support, health and mental health services)

- in developing treatment and management models for those with suicidal crises, taking into account preferences for the presence or support of whānau or significant others

- in developing services, giving Māori the opportunity to be treated by Māori, to have cultural advisors present at assessment, and taking into consideration issues of unresolved grief and/or loss of cultural status (mana).

Suicide prevention services for Māori could be developed within existing Māori community development, health, welfare or suicide prevention services, with faith-based organisations, or within mainstream services, and may involve developing or enhancing specialist mental health services so that Māori people who are suicidal can be offered the service of specialist Māori mental health workers. Currently such services may be found among Māori staff in health services, DHB specialist Māori mental health teams, staff at Māori health units attached to hospitals, iwi health providers (eg, Māori community support workers), iwi networks, and NGO Māori health and social services. Collaborative mental health and suicide prevention services need to specify clearly individual roles and responsibilities in consultation with the individuals concerned and the whānau and/or family.

Collective notions of Māori identity may mean that individualistic services are inappropriate for some Māori. There are several areas in which services may need to be tailored to ensure at-risk Māori receive prompt and appropriate treatment. These areas include crisis response services, in which teams may be trained by Māori health professionals to ensure early intervention occurs; and alcohol and other drug services and mental health services, for Māori with comorbid substance abuse and mental health problems.

Pacific peoples

There is little New Zealand research about suicidal behaviour among Pacific groups in New Zealand. The exception is for young Samoans (Tiatia and Coggan 2001; Wilson and Everts 1995; Pulotu-Endemann et al 2004; Mahina 2002). The development of a national suicide prevention strategy in New Zealand which is responsive to the needs of Pacific peoples requires consideration of their cultural contexts and beliefs. Their beliefs about mental illness, including suicide, lead to a view of mental illness, and of suicide, that often differs from Western views. Pacific populations in New Zealand are heterogeneous and culturally diverse, and perceptions about suicide and mental health may differ from group to group. There may also be generational differences in views of illness and suicide, particularly between young New Zealand-born Pacific people and their Island-born parents and grandparents. However, the different Pacific

groups do tend have a common history of immigration and assimilation in New Zealand (Ministry of Health 1997).

Pacific peoples often have a strong sense of belonging to their families, the church and the Pacific community. An individual's identity and wellbeing are traditionally dependent on family heritage, family connections, roles and responsibilities. Although the strength of mutual family obligations is weakening due to socioeconomic factors and assimilation within New Zealand society, the extended family structure is still at the centre of Pacific cultures, behaviours and beliefs (Ministry of Health 1997; Finau 1982). These social organisations (family and church) provide significant and meaningful relationships that protect members against suicide (Resnick et al 1997; Finau 1982, 1994; Skegg 1997), and that need to be respected in developing suicide prevention strategies and services.

Mental illness is often believed to be a result of breaking of tapu (taboo), usually involving offences against family, superiors, sacred symbols and places. The traditional healer is usually the first person consulted when a Pacific person becomes mentally unwell. Suicide is considered to be the ultimate rejection of one's family and is shameful to the family, especially in relation to a family's sense of failure to adequately care for and support the individual who is ill (Bathgate and Pulotu-Endemann 1997). Other issues that need to be considered in developing appropriate suicide prevention strategies and services include cycles of social and inter-generational disadvantage, poor socioeconomic status, and decline in parental support associated with the disintegration of traditional family structures. These issues may be compounded by migration, urbanisation and the resultant loss of social support and significant interpersonal relationships (Finau and Lasalo 1985).

Services for Pacific people require consideration of their cultural contexts and beliefs. Pacific people who are suicidal should be offered the input of specialist Pacific mental health workers, and their preference for involving family or other support (eg, church leaders, traditional healers) should be sought and respected. Language barriers may be an issue for some Pacific people, but ensuring confidentiality can be difficult when interpreters are used, due to the small size of Pacific communities and the shame associated with suicidal behaviour. Suicide prevention services responsive to the needs of Pacific people may be developed *de novo* or provided by enhancing existing mental health services at Pacific health units attached to hospitals, DHB mental health teams, and Pacific health providers.

People of Indian descent

Developing a suicide prevention strategy that is cognisant of issues relating to people of Indian ethnicity poses similar challenges to those that need to be addressed for other cultures. Family and religion, in particular, play an important role in individual health and wellbeing. Indian people in New Zealand come from diverse cultures, and suicide prevention strategies need to acknowledge this diversity and the specific cultural contexts and beliefs entailed. Indian people consider family roles and obligations to be of primary importance, and these priorities need to be acknowledged in suicide prevention strategies. Immigration and acculturation place strains on traditional family roles and responsibilities, and on individuals who fail to meet these roles. In particular, 'shame' and 'losing face' are powerful constructs, and ways of addressing these matters (by, for example, various forms of family therapy) need to be taken account of in treatment and management practices for those with mental health problems and/or suicidal behaviour.

Asian populations

Asians constitute the fastest-growing ethnic community in New Zealand. They come from diverse ethnic, religious and political backgrounds but nevertheless share some common beliefs and experiences. Issues that need to be considered in ensuring that suicide prevention strategies are appropriate for Asians include recognising that cultural values and beliefs vary depending on the subculture and the individual's own degree of acculturation to Western values. Among Chinese people, suicide is seen as stigmatising and shaming, both to the individual and to the collective esteem of the family. Traditional values disapprove of divulging information that is private or shameful to people outside of the family, let alone to a person of another culture. Services for people from Asian communities who are suicidal or mentally ill should provide options for culturally appropriate services. Language barriers may be a major difficulty for some Asians, particularly around the issue of understanding and discussing complex emotions in English. There can be difficulties in obtaining interpreters who are not known to the person or their family, and who will not contribute to the person's sense of shame and stigmatisation.

Refugee groups

Many refugees have endured or witnessed some sort of physical or psychological trauma (Ministry of Health 2001a). It is estimated that 40 percent of refugees have directly experienced severe trauma. Consequently, they are at increased risk for physical and psychological sequelae of these experiences, including suicidal behaviour. Often refugees have experienced multiple losses – family, home, identity, role, language, culture, sense of self and trust in others (Ministry of Health 2001a). A number of issues need to be considered in developing suicide prevention strategies that are inclusive of the refugee population.

Refugees may be distrustful of official agencies and health systems. Clinical services need to take care to make transparent the intention behind any action, and the potential consequences for the person. If interpreters are needed, care must be taken over confidentiality issues because many of the communities are small and people may know each other. Refugees with mental health problems may be referred to specialist services (eg, Refugees as Survivors).

Developing culturally appropriate suicide prevention services

There are a number of generic and pragmatic issues that need to be addressed when developing culturally informed suicide prevention strategies (Institute of Medicine 2002; US Department of Health and Human Services 2004). These are discussed below.

There are no universally accepted definitions for suicidal behaviour, and this issue becomes especially challenging when measuring suicidality in a range of cultures. In particular, research and evaluation with culturally and linguistically diverse populations raise problems of measurement equivalence, determination of suicidal intent, cultural variation in concepts and language used for suicide, and difficulties in conveying complex personal, philosophical and cognitive feelings in a different language.

For various cultural groups a qualitative research approach (eg, using focus groups) may assist discussion and increase engagement with groups. The use of telemedicine technologies may increase inclusion and participation, particularly of groups in remote areas for whom service delivery and research are problematic.

A range of ethical considerations need to be taken into account when conducting research with culturally diverse groups. Key concepts include respect for the community, establishing trust and collaborative working arrangements with the community, the need to develop a transparent consent process taking into account low levels of literacy, and power imbalances between the researcher and participants. For some communities and some studies it may be necessary for the researcher and community to jointly develop consent procedures, study aims and safeguards. It may be necessary to obtain community consent as well as individual consent. Being cognisant of cultural taboos and understanding the belief systems surrounding suicidal behaviour may promote engagement with culturally different communities and help to minimise the stigma that often accompanies mental illness and suicidal behaviour in those communities.

Culture plays a significant role in suicidality, as shown by evidence that ethnic groups transport cultural patterns of suicidal behaviour with them on migration. Migrants patterns and methods of suicide more closely resemble those of their country of origin than those of the country to which they have moved. Suicide patterns come to resemble those of the host country as successive generations become established and acculturated (Singh and Siahpush 2001; Hovey and King 1997; Hovey 2000a, 2000b). Family, cultural maintenance, ethnic density and social integration appear to be protective factors for most ethnic groups. Spiritual or religious belief also appears to protect against suicide for many ethnic groups, although if a religious group is a minority the protective effect may be lost.

Less acculturated members of ethnic groups in New Zealand (other than Māori) tend to have lower rates of usage of mental health services than the general population. Developing a culturally appropriate suicide prevention strategy may mean investing in improving the accessibility and acceptability of mental health services for members of other ethnic groups. Services could be improved by implementing existing blueprints fully, and using more language interpreters, cultural interpreters and ethnic advisors. Ethno-specific services, training mainstream staff in cross-cultural issues, and acknowledging the client's commitments to spiritual beliefs and family (where appropriate) are likely to be beneficial. In particular, GPs need to have access to interpreters (at no cost to themselves or the patient) to deal with mental health issues.

More generally, understanding how culture relating to ethnicity can best be incorporated into suicide prevention strategies is a developing field and a challenge to be addressed in implementing such strategies.

5   Actions to Reduce and Prevent Suicide

In the previous sections, the epidemiology and time trends of suicidal behaviour in New Zealand were summarised and the research literature about risk and protective factors for suicidal behaviour was reviewed. The major themes relevant to preventing suicide and suicide attempt that emerge from these reviews are outlined below (for further reviews see also Institute of Medicine 2002; Gould et al 2003; Shaffer et al 2001; Hawton and van Heeringen 2000; Jacobs et al 2003; Hawton et al 2000; Maris et al 2000).

Although research findings suggest that a range of social, personality, childhood and related factors make contributions to risks of suicidal behaviour, by far the largest contribution comes from mental health problems, in particular, mood disorders, previous suicidal behaviour, and mental health problems. These findings imply that a major plank of any pragmatic, evidence-based suicide prevention strategy must involve approaches that aim to improve the detection, treatment, management and prevention of these disorders in the population.

The most general approach is through population-based approaches that encourage positive mental health, improved public understanding of mental illness, and improved detection, treatment and management of mental disorders. Two approaches may be of particular use: initiatives focusing on the better recognition, treatment and management of depression; and parallel programmes designed to address alcohol and substance-use disorders.

Although population-based initiatives may reduce rates of mental disorders within the population, inevitably a fraction of the population will develop such disorders. This requires the availability of adequate psychiatric services to address their mental health needs.

A theme that pervades research into suicidal behaviour is that a small but conspicuous group of young people vulnerable to suicidal behaviours is characterised by childhood histories of social disadvantage and family dysfunction. These findings suggest that an important step in reducing the number of people who are vulnerable to suicidal behaviours is through programmes that reduce the number of children exposed to unsatisfactory, disadvantaged or dysfunctional environments that lead to the risk of later suicide attempt.

There are a number of strategies by which this target might be achieved, including population-based programmes designed to reduce social inequity and social discrimination. Such programmes may make an effective contribution to (especially youth) suicide prevention by providing an equitable social environment in which other, more targeted, approaches to suicide prevention would have their best chance of success. Another approach focuses on the development of general mental health programmes, which aim to foster good mental health skills to promote resiliency and address the psychosocial needs of those exposed to stress and adversity. A further approach lies in school-based competency-promoting and stress-reducing programmes to reduce the risks of mental disorders and behaviours with which suicidal behaviour is associated.

A further approach to youth suicide prevention lies with the provision of family support and early intervention programmes targeting at-risk families and designed to ameliorate infant and early-childhood exposure to family disadvantage and dysfunction, and to optimise childhood and adolescent educational and life opportunities.

An important research finding is that young people in welfare care are at increased risk of suicidal behaviour compared with their peers who do not access welfare services. A further approach to suicide prevention may lie in developing targeted programmes to ensure young people receiving welfare care get adequate supportive care and protection, and appropriate mental health services.

One of the overall purposes of a national suicide prevention strategy must be to reduce inequalities among different population groups. Reducing suicidal behaviour in Māori youth should be a priority for action. Accordingly, a national strategy needs to be designed to be consistent with Māori needs and expectations, to improve Māori health and wellbeing and to promote Māori development. Young Māori people have higher rates of suicidal behaviour than their non-Māori peers and are disproportionately represented in suicide and suicide attempt statistics. The Māori concept of hauora is central in the lives of many Māori, and a national strategy must recognise that suicide prevention activities in New Zealand must be cognisant of this broad, holistic view of health.

A major population-based component of many national suicide prevention strategies focuses on restricting access to means of suicide. However, the wide availability of the most common methods of suicide in New Zealand (hanging, vehicle exhaust gas) suggests that there is limited scope for the restriction of access to means of suicide to play a substantial role in New Zealand suicide prevention, for youth or for adults. Nevertheless, where it is possible to minimise suicide risk by restricting access to methods of suicide, these restrictions should be instituted as a matter of responsible and prudent 'best practice'.

Most young people who die by suicide are not teenagers but young adults aged 20–24 years. However, the majority of those who make non-fatal suicide attempts are young (predominantly female) teenagers. This observation implies that youth suicide prevention programmes need to be inclusive and developed for the entire age range of 15–24 years. To date, youth suicide programmes have tended to focus on school-based approaches. There is a dearth of prevention programmes appropriate for young males aged 18–24 who have left school and who constitute the majority of so-called youth suicides. Young people, especially males, who are not affiliated with either a work or an educational enterprise and who might be described as drifting are at increased risk of suicide and suicide attempt.

The profile of risk and protective factors in adults is similar in many ways to that for youth. The major exception is that childhood and family experiences appear to play a lesser role in suicidal behaviours by adults and older people, and, conversely, mental health factors and recent life events emerge as being more influential. This is particularly evident for mood disorders, which play an increasingly significant role in the aetiology of suicide with increasing age. The major implication of these findings is that for adult – and particularly older adult – populations, prevention strategies should focus very strongly on the detection, treatment and management of depression and the better recognition of the life event, social, family and related factors that may contribute to the development of depression in older adults.

The majority (approximately 75 percent) of those who die by suicide have contact with primary-care providers in the year prior to their death, and approximately one-third have contact with mental health services. In the final month before death, almost half of suicide victims have contact with primary-care providers, with rates of contact higher among older, compared with younger, adults. These contacts suggest primary-care providers are potentially well placed to detect and assist a substantial fraction of those with mood disorders and suicidal behaviours. However, there is also a need to improve public knowledge and attitudes about mental illness, depression and treatment in order to encourage and support help-seeking behaviours among those adults, predominantly males, who do not presently go to primary-care providers for mental health problems. For this group there is also a need to develop alternative sources of community-based support.

The effective prevention of suicide will likely require a multi-sectoral approach that integrates both individual-level and population-level programmes to minimise the circumstances that encourage suicidal behaviours. The risk factors for suicidal behaviour are similar to those for a range of related adverse psychosocial outcomes. Therefore it is unlikely that significant reductions in suicide rates will be achieved without corresponding reductions in the rates of depression, substance abuse (including alcohol abuse and cannabis dependency), and domestic violence.

The multi-factorial nature of suicide implies that there is a need to develop a public–private partnership to address suicide prevention, with this partnership co-ordinated across government agencies and integrated across public and private sectors. An approach that addresses an array of problems with common risk factors and causal pathways will have a better chance of ensuring that intervention and prevention programmes become embedded and institutionalised across a range of local, regional and national activities than an approach that attempts to focus on suicide as a single social issue. Such partnership structures will require adequate, sustained government and community support and resources to ensure that reductions in suicide rates are pursued using empirically developed and well-evaluated programmes. Specifically, there is a need to ensure sustained funding for suicide research and prevention.

Points of effective intervention

There is, generally, limited information about the efficacy, effectiveness and cost-effectiveness of a range of suicide prevention programmes. The current research evidence about risk and protective factors for suicide and suicide attempts, and what appears effective or holds promise of effectiveness in reducing suicidal behaviour, suggest the following specific points of intervention to reduce suicide and suicide attempt.

Promotion of mental health and mental health literacy

- Investment in the development and evaluation of a range of programmes that seek to change public attitudes to suicide, depression and mental health problems among the general public and within the health and caring professions.

- Specific investment in a national depression awareness programme that seeks to enhance the recognition, treatment and effective management of depression.

- Specific investment in a programme that focuses on heightening public awareness and recognition of alcohol-related problems, and the link between alcohol abuse, depression and suicide.

- Specific investment in programmes that attempt to reduce the number of people engaging in the harmful use of illicit drugs.

Media reporting

- Encouragement of muted media reporting of suicide and related events by maintaining, implementing and promoting the use of existing media resources.

Restrict access to means of suicide

- Investment, where appropriate, in policies and programmes that restrict access to potentially lethal means of suicide.

Minimise suicide risk in high-risk populations

- Investment in improving access to mental health services, and ensuring a 'chain of care' (or continuity of care) within such services for people with mental illnesses and/or suicidal behaviour.

- Development of policies and programmes that improve awareness, recognition and treatment of psychiatric illness, mental distress and suicidal ideation and behaviour in people with physical illness.

- Provision of appropriate services to ameliorate the impact of life crises.

- Investment in programmes that seek to reduce suicide in young Māori.

- Investment in programmes that seek to reduce suicide in people of other ethnicities in New Zealand, including Pacific and Asian peoples, and refugee and immigrant populations.

- Investment in programmes designed to develop more effective coping mechanisms in a range of population groups.

- Investment in programmes that seek to improve a sense of inclusiveness for groups that are alienated and disaffiliated, including the isolated elderly, refugees, immigrants, those with mental illness and socially alienated young men.

- Investment in policies, services and programmes that seek to minimise risk of further suicidal behaviour among individuals with a history of suicide attempt.

- Investment in policies and programmes that seek to address suicide rates among men.

- Investment in programmes that support at-risk and problem families.

- Development of policies and programmes that seek to minimise suicides in prisons and police custody cells.

- Investment in the development of policies, services and programmes that seek to reduce suicidal behaviour in older adults.

- Provision of appropriate support and services for families with individuals with mental illness and suicidal behaviour, including support services for families bereaved by suicide, and families with experience of a (non-fatal) suicide attempt.

Improve timeliness of statistical information and dissemination, and fund research

- Investments to ensure improved and timely statistical information about suicide morbidity and mortality.

- Investment in research about suicide, suicide prevention and related issues, including, as a priority, the systematic and appropriate evaluation of all suicide prevention and intervention programmes.

- Evaluation of the proposed national strategy for suicide prevention.

- Investment to ensure existing and new informational and educational guidelines for various professional groups are implemented fully and their effectiveness is evaluated.

- Effective dissemination of research evidence about suicidal behaviour, and about the effectiveness, efficiency and cost effectiveness of suicide prevention programmes.

Similarities and differences in perspectives

A series of issues emerge from the review of literature and from consideration of points of effective intervention to prevent suicidal behaviour. These issues are outlined below.

Reconciling the mainstream and socioeconomic perspectives

A potential tension in the debate about the aetiology of suicide comes from the difference between mental health and psychological perspectives, which emphasise mental health and personal circumstances as determinants of suicide, compared to a sociological perspective, which emphasises macrosocial factors and, notably, socioeconomic disadvantage, as determinants of suicidal behaviours. The present report encompasses both perspectives. As noted, aside from a possible role of unemployment as a precipitating factor in suicide, there is no firm evidence linking macrosocial and economic trends to changing rates of suicidal behaviours. These considerations suggest that, at the present time, socioeconomic factors should be seen as playing a relatively minor role in the aetiology of suicidal behaviours. At the same time limitations in the existing evidence are such that the potential role of socioeconomic factors as determinants of suicide should not be overlooked.

Cultural and ethnic perspectives

A second major difference in perspective comes from the tension between a predominantly Western and scientific perspective of risk and protective factors for suicidal behaviour and alternative cultural perspectives. There are, nonetheless, some broad agreements about the role of aetiological factors and the need for services. Specifically, both views recognise the potential roles of mental health and socioeconomic disadvantage, and both emphasise the need for services that are sensitive to, and meet the needs of, various key populations in New Zealand including Māori, Pacific peoples, Asian, immigrant and refugee populations. These considerations suggest that a national suicide prevention strategy needs to be sufficiently broad-

based to recognise that the same risk factors apply in similar ways in different populations, while at the same time recognising the need for population-specific interventions that meet the needs of different social and cultural groups.

Perspectives on risk and resiliency

Recent popular and policy debates about youth suicide in New Zealand have focused on the issue of risk or resiliency to suicidal behaviour. However, in contrast to the inclusive and comprehensive framework outlined by Masten and Powell (2003), arguments in New Zealand have tended to adopt a limited perspective in which risk factor research has been denigrated as 'negative', and resiliency and strengths-based research has been acclaimed as 'positive'. The reasons for this emphasis appear to arise from the view that (a) risk factor research is overly negative, and/or (b) that solutions to the problem of suicide can be best addressed by discovering factors that contribute to resiliency to adversity. These assumptions have led to the development of a small literature that has made strong claims about the ways in which various factors may contribute to resiliency to suicide. Despite the appeal of this literature in many quarters, the research evidence on resiliency to suicidal behaviour is sparse, and there is little evidence about clear factors that protect against suicide, and few clear and replicated estimates of the extent of these buffering effects.

The role of the community

In previous New Zealand suicide prevention policy there has been a strong emphasis on community-based initiatives to address suicide. This perspective is well exemplified by the National Youth Suicide Prevention Strategy (Ministry of Youth Affairs et al 1998). In this respect New Zealand suicide prevention policy emerges as being atypical, since, internationally, there is increasing recognition and focus on the development of professional and related services. This view is exemplified by the US review of evidence of causal factors, prevention initiatives and a blueprint for the development of effective services for suicide prevention (Institute of Medicine 2002).

A policy issue that clearly requires careful thought relates to achieving a balance between perspectives emphasising the role of the community in suicide prevention, and perspectives focusing on the development of effective professional services. To date, New Zealand's policy has been heavily weighted to the community model with a lesser investment in the areas of professionally led services. These policy investments may need to be revisited in the light of the strong evidence about the role of mental health issues in suicide prevention, the increasing focus on genetic and biological factors in the aetiology of suicidal behaviour, and the growing investment (in most overseas countries) in approaches to suicide prevention that centre on primary care providers, mental health services, establishing 'chains of care' within such services for those who are suicidal, clinical research, and systematic and appropriate evaluation of all suicide prevention and intervention programmes.

In addition, there is a relative dearth of evidence about the effectiveness of community-based interventions in the area of suicide prevention. There is a need to ensure that existing and proposed community-based suicide prevention programmes are subjected to systematic and appropriate evaluation.

These considerations suggest that there may be a need for informed comment at a national level about suicide prevention, the national strategy, research priorities, evaluation of preventive approaches and implementation of best practice guidelines. This need might best be addressed by creating an expert advisory board which includes national and international representation, and representation from the professional and service groups most closely aligned with suicide prevention in New Zealand, while at the same time acknowledging that community groups have a role in suicide prevention activities. Striking an appropriate balance between professional perspectives and community perspectives is likely to be critical to the success of any national suicide prevention strategy.

6   Conclusions

Research evidence clearly suggests that suicide is multifactorial and complex. Consequently, there seems to be a range of different populations and sites for potential interventions to prevent or reduce suicide. This raises the issue of how best to make decisions about what types of suicide prevention programmes should be supported.

One means of addressing this issue is to use the findings from risk factor research to compute the population-attributable risk (PAR) (Bruzzi et al 1985; Benichou 1991). The PAR measures the percentage reduction in the rate of suicide (or suicide attempt) that would occur if (a) the risk ratio faithfully described the causal relationship between the risk factor and risks of suicide, and (b) all subjects were not exposed to the risk factor (Krug et al 2002).

A series of studies has calculated PARs for a range of risk factors for suicidal behaviour. In one of the first studies to report the PAR statistic, Beautrais, Joyce, Mulder et al (1996) suggested that the:

> ... elimination of all mental disorders considered in the analysis (mood disorders, substance use disorders, anxiety disorders, antisocial behaviours, eating disorders, and non-affective psychosis) would result in a reduction of 76.2 percent in the total number of suicide attempts.

In a further study, the authors estimated PARs for three case control studies of youth suicidal behaviour (Beautrais 1998a; Shaffer et al 1996; Gould et al 1996, 1998; Brent, Perper, Moritz, Baugher et al 1993; Beautrais et al 1998d; Brent, Perper, Moritz, Allman et al 1993; Brent, Johnson, et al 1993; Beautrais et al 1998a, 1998b). All three studies were consistent in generating PAR statistics that suggested that mental health factors (including mood disorders, substance-use disorders, antisocial disorders, previous suicidal behaviour and previous psychiatric care) made the strongest and most consistent contributions to the risk of suicidal behaviour.

An Australian population-based study has estimated that the PARs for mood disorders in suicidal ideation and suicide attempt were of the order of 40 percent, implying that elimination of mood disorders would reduce suicidal ideation and suicide attempt by almost half (Pirkis et al 2000). Similar findings have been reported by Goldney et al (2000). In a population study they found that major depression made the largest contribution to the risk of suicidal ideation, with a PAR of 57 percent. Recently, findings from a national register-based nested case control study of suicide in Denmark showed that a history of hospitalisation for mental disorder was associated with the highest PAR (40 percent) (Qin et al 2003). By comparison, PARs for unemployment, having a sickness-related absence from work, being in the lowest income group, and being on a disability or age pension were 10 percent or lower.

The perspective provided by studies that have estimated PARs suggests that while a wide range of personal, social, family and related factors make contributions to risks of suicidal behaviour, by far the largest contributions come from mental health measures and, particularly, measures of mood disorders, previous suicidal behaviour, mental health history, and prior treatment. The clear implication of these results is that the major focus of suicide prevention efforts should be directed at minimising rates of psychiatric disorders and addressing the risk factors and life pathways that lead to these disorders.

Appendix: Epidemiological Data Sources

The epidemiological material reviewed in this report has been derived from the following data sources.

i.   Information on numbers of deaths and methods of suicide was provided by the New Zealand Health Information Service (NZHIS) from mortality data collated and published annually by the Ministry of Health for the years 1950 to 2000. Unpublished 2001 mortality data was provided for use in this report by NZHIS to the author (ALB).

ii. Data on suicide attempts was provided to the author by NZHIS, but this has been supplemented by material collected by the Canterbury Suicide Project since 1991.

iii. International data on trends in the use of methods for suicide has been obtained from published papers and articles. References are provided for each of these sources.

In New Zealand, suicide is defined by a coronial verdict. All suspected suicide deaths are investigated by a coroner who has the power to order an autopsy and gather all information necessary to reach a verdict on cause of death (Deavoll et al 1993).

References

Abramson LY, Alloy LB, Hogan ME, et al. 2000. The hopelessness theory of suicidality. In: TE Joiner, MD Rudd (eds). *Suicide Science: Expanding the boundaries* (pp. 17−31). Norwell, MA: Kluwer Academic Publishers.

Adams DM, Overholser JC, Lehnert KL. 1994. Perceived family functioning and adolescent suicidal behavior. *Journal of the American Academy of Child and Adolescent Psychiatry* 33(4): 498−507.

Adams DM, Overholser JC, Spirito A. 1994. Stressful life events associated with adolescent suicide attempts. *Canadian Journal of Psychiatry* 39: 43−8.

Allgulander C, Lavori P. 1993. Causes of death among 936 elderly patients with 'pure' anxiety neurosis in Stockholm County, Sweden, and in patients with depressive neurosis or both diagnoses. *Comprehensive Psychiatry* 34: 299−302.

Appleby L, Cooper J, Amos T, et al. 1999. Psychological autopsy study of suicides by people aged under 35. *British Journal of Psychiatry* 175: 168−74.

Appleby L, Dennehy JA, Thomas CS, et al. 1999. Aftercare and clinical characteristics of people with mental illness who commit suicide: a case-control study. *Lancet* 353: 1397−400.

Appleby L, Shaw J. 1999. Suicide within 12 months of contact with mental health services: national clinical survey. *British Medical Journal* 318: 1235−9.

Apter A, Bleich A, King RA, et al. 1993. Death without warning? A clinical postmortem study of suicide in 43 Israeli adolescent males. *Archives of General Psychiatry* 50: 138−42.

Apter A, Gothelf D, Orbach I, et al. 1995. Correlation of suicidal and violent behavior in different diagnostic categories in hospitalized adolescent patients. *Journal of the American Academy of Child and Adolescent Psychiatry* 34(7): 912−18.

Arango V, Ernsberger P, Marzuk PM, et al. 1990. Autoradiographic demonstration of increased serotonin 5-HT2 and beta-adrenergic receptor binding sites in the brain of suicide victims. *Archives of General Psychiatry* 47(11): 1038−147.

Arango V, Underwood MD, Gubbi AV, et al. 1995. Localized alterations in pre- and postsynaptic serotonin binding sites in the ventrolateral prefrontal cortex of suicide victims. *Brain Research* 688(1−2): 121−33.

Arango V, Underwood MD, Mann JJ. 1996. Fewer pigmented locus coeruleus neurons in suicide victims: preliminary results. *Biological Psychiatry* 39(2): 112−20.

Asarnow JR, Guthrie D. 1989. Suicidal behavior, depression, and hopelessness in child psychiatric inpatients: a replication and extension. *Journal of Clinical Child Psychology* 18(2): 129−36.

Asberg M, Nordstrom P, Traskman-Bendz L. 1986. Cerebrospinal fluid studies. In: JJ Mann, M Stanley (eds). *Psychobiology of Suicidal Behaviour*. New York: New York Academy of Sciences.

Bagley C, Tremblay P. 1997. Suicidal behaviors in homosexual and bisexual males. *Crisis* 18(1): 24−34.

Bathgate M, Pulotu-Endemann K. 1997. Pacific people in New Zealand. Chapter 4 in *Mental Health in New Zealand From a Public Health Perspectiv*e. Public Health Report No. 3. Wellington: Ministry of Health.

Baud P. 2005. Personality traits as intermediary phenotypes in suicidal behavior: genetic issues. *American Journal of Medical Genetics* 133C(1): 34−42.

Beautrais AL. 1996. Serious suicide attempts in young people: a case control study. PhD dissertation, University of Otago.

Beautrais AL. 1998a. Risk factors for serious suicide attempts among young people: a case control study. In: R Hassan (ed). *Suicide Prevention: The global context* (pp. 167−81). New York: Plenum Press.

Beautrais AL. 1998b. Risk factors for suicide over the life course. Paper presented at the American Association of Suicidology (AAS) Conference, Washington DC, 1998.

Beautrais AL. 1999a. *Methods of Suicide in New Zealand 1977−1996*. Wellington: Ministry of Health.

Beautrais AL. 1999b. Risk factors for suicide and attempted suicide among young people. *Commonwealth Department of Health and Aged Care, National Youth Suicide Prevention Strategy: Setting the evidence-based research agenda for Australia (A literature review)* (pp. 113−278). Canberra: Commonwealth of Australia.

Beautrais AL. 2000a. Methods of youth suicide in New Zealand: trends and implications for prevention. *Australian and New Zealand Journal of Psychiatry* 34: 413−19.

Beautrais AL. 2000b. *Restricting Access to Means of Suicide in New Zealand: A report prepared for the Ministry of Health on methods of suicide in New Zealand 1997−1996*. Wellington: Ministry of Health.

Beautrais AL. 2000c. Risk factors for suicide and attempted suicide amongst young people. *Australian and New Zealand Journal of Psychiatry* 34: 420−36.

Beautrais AL. 2001a. Child and young adolescent suicide in New Zealand. *Australian and New Zealand Journal of Psychiatry* 35: 647−53.

Beautrais AL. 2001b. Suicides and serious suicide attempts: two populations or one? *Psychological Medicine* 31: 837−45.

Beautrais AL. 2002. Gender issues in youth suicidal behaviour. *Emergency Medicine* 14: 35−42.

Beautrais AL. 2003a. Life course factors associated with suicidal behaviors in young people. *American Behavioural Scientist* 46(9): 1137−56.

Beautrais AL. 2003b. Subsequent mortality in medically serious suicide attempts: a 5 year follow-up. *Australian and New Zealand Journal of Psychiatry* 37(5): 595−9.

Beautrais AL. 2003c. Suicide and serious suicide attempts in young people: a multiple group case control study. *American Journal of Psychiatry* 160(6): 1093−9.

Beautrais AL. 2003d. Suicide in New Zealand I: Time trends and epidemiology. *New Zealand Medical Journal* 116(1175), URL: http://www.nzma.org.nz/journal/116-1175/460/

Beautrais AL. 2003e. Suicide in New Zealand II: A review of risk factors and prevention. *New Zealand Medical Journal* 116(1175), URL: http://www.nzma.org.nz/journal/116-1175/461/

Beautrais AL. 2004a. Further suicidal behaviour amongst medically serious suicide attempters. *Suicide and Life Threatening Behavior* 34(1): 1−11.

Beautrais AL. 2004b. Subsequent mortality in medically serious suicide attempts: a 5 year follow-up. *Australian and New Zealand Journal of Psychiatry* 37(5): 595−9.

Beautrais AL. 2004c. *Suicidal Behaviour in Older Adults: Risk factors and recommendations of prevention.* Sydney NSW Elderly Suicide Prevention Network. Available on CD Rom.

Beautrais AL, Joyce PR, Mulder RT. 1996. Risk factors for serious suicide attempts among youth aged 13−24. *Journal of the American Academy of Child and Adolescent Psychiatry* 35(9): 1174−82.

Beautrais AL, Joyce PR, Mulder RT. 1997. Precipitating factors and life events in serious suicide attempts among youths aged 13 through 24 years. *Journal of American Academy of Child and Adolescent Psychiatry* 36(11): 1543−51.

Beautrais AL, Joyce PR, Mulder RT. 1998a. Psychiatric contacts among youths aged 13 through 24 years who made serious suicide attempts. *Journal of the American Academy of Child and Adolescent Psychiatry* 37(5): 504−11.

Beautrais AL, Joyce PR, Mulder RT. 1998b. Psychiatric illness in a New Zealand sample of young people making serious suicide attempts. *New Zealand Medical Journal* 111: 44−8.

Beautrais AL, Joyce PR, Mulder RT. 1998c. Unemployment and serious suicide attempts. *Psychological Medicine* 28(1): 209−18.

Beautrais AL, Joyce PR, Mulder RT. 1998d. Youth suicide attempts: a social and demographic profile. *Australian and New Zealand Journal of Psychiatry* 32: 349−57.

Beautrais AL, Joyce PR, Mulder RT. 1999a. Cannabis abuse and serious suicide attempts. *Addiction* 94: 1155−64.

Beautrais AL, Joyce PR, Mulder RT. 1999b. Personality traits and cognitive styles as risk factors for serious suicide attempts among young people. *Suicide and Life-Threatening Behavior* 29: 37−47.

Beautrais AL, Joyce PR, Mulder R. 2000. Unmet need following serious suicide attempt: follow-up of 302 subjects for 30 months. In: G Andrews, S Henderson (eds). *Unmet Need in Psychiatry* (pp. 245−55). Cambridge: Cambridge University Press.

Beautrais AL, Joyce PR, Mulder RT, et al. 1996. Prevalence and comorbidity of mental disorders in persons making serious suicide attempts: a case control study. *American Journal of Psychiatry* 153: 1009−14.

Beck AT, Brown G, Berchick RJ, et al. 1990. Relationship between hopelessness and ultimate suicide: a replication with psychiatric outpatients. *American Journal of Psychiatry* 147(2): 190−5.

Beck AT, Brown G, Steer RA. 1989. Prediction of eventual suicide in psychiatric inpatients by clinical ratings of hopelessness. *Journal of Consulting and Clinical Psychology* 57(2): 309−10.

Beck AT, Steer RA, Beck JS, et al. 1993. Hopelessness, depression, suicidal ideation, and clinical diagnosis of depression. *Suicide and Life-Threatening Behavior* 23(2): 139−45.

Beck AT, Steer RA, Kovacs M, et al. 1985. Hopelessness and eventual suicide: a 10-year prospective study of patients hospitalized with suicidal ideation. *American Journal of Psychiatry* 142(5): 559−63.

Benichou J. 1991. Methods of adjustment for estimating the attributable risk in case-control studies: a review. *Statistics in Medicine* 10: 1753−73.

Benjaminsen S, Krarup G, Lauritsen R. 1990. Personality, parental rearing behaviour and parental loss in attempted suicide: a comparative study. *Acta Psychiatrica Scandinavica* 82: 389−97.

Bennett S, Coggan C, Adams P. 2002. Young people's pathways to well-being following a suicide attempt. *International Journal of Mental Health Promotion* 4(3): 25−32.

Bierut LJ, Dinwiddie SH, Begleiter H, et al. 1998. Familial transmission of substance dependence: alcohol, marijuana, cocaine, and habitual smoking. *Archives of General Psychiatry* 55(11): 982–8.

Bille-Brahe U, Schmidtke A, Kerkhof AJFM, et al. 1994. Background and introduction to the study. In: AJFM Kerkhof, A Schmidtke, U Bille-Brahe, et al (eds). *Attempted Suicide in Europe: Findings from the Multicentre Study on Parasuicide by the WHO Regional Office for Europe* (pp. 3–17). Leiden: DSWO Press.

Birckmayer J, Hemenway D. 1999. Minimum-age drinking laws and youth suicide, 1970–1990. *American Journal of Public Health* 89(9): 1365–8.

Blakely T. 2002. *The New Zealand Census – Mortality Study: Socioeconomic inequities and adult mortality 1991–1994.* Wellington: Ministry of Health.

Blakely TA, Collings SCD, Atkinson J. 2003. Unemployment and suicide: evidence for a causal association? *Journal of Epidemiology and Community Health* 57: 594–600.

Blum RW, Halcon L, Beuhring T, et al. 2003. Adolescent health in the Caribbean: risk and protective factors. *American Journal of Public Health* 93(3): 456–60.

Bonner RL. 1992. Isolation, seclusion, and psychosocial vulnerability as risk factors for suicide behind bars. In: RW Maris, AL Berman, JT Maltsberger, et al (eds). *Assessment and Prediction of Suicide* (pp. 398–419). New York: Guilford Press.

Bonner RL, Rich AR. 1991. Predicting vulnerability to hopelessness: a longitudinal analysis. *Journal of Nervous and Mental Disease* 179(1): 29–32.

Borowsky IW, Ireland M, Resnick MD. 2001. Adolescent suicide attempts: risks and protectors. *Pediatrics* 107(3): 485–93.

Borowsky IW, Resnick MD, Ireland M, et al. 1999. Suicide attempts among American Indian and Alaska Native youth: risk and protective factors. *Archives of Pediatric and Adolescent Medicine* 153: 573–80.

Boxer PA, Burnett C, Swanson N. 1995. Suicide and occupation: a review of the literature. *Journal of Occupational and Environmental Medicine* 37: 442–52.

Boyce P, Carter G, Penrose-Wall J, et al. 2003. Summary Australian and New Zealand clinical practice guideline for the management of adult deliberate self harm (2003). *Australasian Psychiatry* 11(2): 150–5.

Breed W. 1963. Occupational mobility and suicide among white males. *American Sociological Review* 28: 179–88.

Brent DA, Baugher M, Bridge J, et al. 1999. Age- and sex-related risk factors for adolescent suicide. *Journal of the American Academy of Child and Adolescent Psychiatry* 38(12): 1497–505.

Brent DA, Bridge J, Johnson BA, et al. 1996. Suicidal behavior runs in families: a controlled family study of adolescent suicide victims. *Archives of General Psychiatry* 53: 1145–52.

Brent DA, Johnson B, Bartle S, et al. 1993. Personality disorder, tendency to impulsive violence, and suicidal behavior in adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* 32(1): 69–75.

Brent DA, Johnson BA, Perper J, et al. 1994. Personality disorder, personality traits, impulsive violence, and completed suicide in adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* 33(8): 1080–6.

Brent DA, Kolko DJ, Birmaher B, et al. 1998. Predictors of treatment efficacy in a clinical trial of three psychosocial treatments for adolescent depression. *Journal of the American Academy of Child and Adolescent Psychiatry* 37(9): 906–14.

Brent DA, Mann JJ. 2005. Family genetic studies, suicide, and suicidal behavior. *American Journal of Medical Genetics* 133C: 13–24.

Brent DA, Perper JA, Goldstein CE, et al. 1988. Risk factors for adolescent suicide: a comparison of adolescent suicide victims with suicidal inpatients. *Archives of General Psychiatry* 45: 581–8.

Brent DA, Perper JA, Moritz G, et al. 1993. Psychiatric risk factors for adolescent suicide: a case-control study. *Journal of the American Academy of Child and Adolescent Psychiatry* 32(3): 521–9.

Brent DA, Perper J, Moritz G, et al. 1993. Suicide in adolescents with no apparent psychopathology. *Journal of the American Academy of Child and Adolescent Psychiatry* 32(3): 494–500.

Brent DA, Perper JA, Moritz G, et al. 1993. Stressful life events, psychopathology, and adolescent suicide: a case control study. *Suicide and Life-Threatening Behavior* 23(3): 179–87.

Brodsky BS, Malone KM, Ellis SP, et al. 1997. Characteristics of borderline personality disorder associated with suicidal behavior. *American Journal of Psychiatry* 154(12): 1715–19.

Brown GL, Goodwin FK. 1986. Cerebrospinal fluid correlates of suicide attempts and aggression. *Annals of the New York Academy of Sciences* 487: 175–88.

Brown GW, Harris TO. 1978. *Social Origins of Depression: A study of psychiatric disorders in women*. London: Tavistock.

Brown J, Cohen P, Johnson JG, et al. 1999. Childhood abuse and neglect: specificity of effects on adolescent and young adult depression and suicidality. *Journal of the American Academy of Child and Adolescent Psychiatry* 38(12): 1490–6.

Bruzzi P, Green SB, Byar DP, et al. 1985. Estimating the population attributable risk for multiple risk factors using case-control data. *American Journal of Epidemiology* 122: 904–14.

Bucca M, Ceppi M, Peloso P, et al. 1994. Social variables and suicide in the population of Genoa, Italy. *Comprehensive Psychiatry* 35(1): 64–9.

Burgess P, Pirkis J, Morton J, et al. 2000. Lessons from a comprehensive clinical audit of users of psychiatric services who committed suicide. *Psychiatric Services* 51(12): 1555–60.

Cadoret RJ, Yates WR, Troughton E, et al. 1995. Genetic-environmental interaction in the genesis of aggressivity and conduct disorders. *Archives of General Psychiatry* 52(11): 916–24.

Caine ED, Conwell Y. 2001. Suicide in the elderly. *International Clinical Psychopharmacology* 16(Suppl. 2): S25–30.

Caldwell TM, Jorm AF, Dear KBG. 2004. Suicide and mental health in rural, remote and metropolitan areas in Australia. *Medical Journal of Australia* 181(7): S10–14.

Carlson GA, Cantwell DP. 1982. Suicidal behavior and depression in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry* 21(4): 361–8.

Caspi A, Moffitt TE, Newman DL, et al. 1996. Behavioral observations at age 3 years predict adult psychiatric disorders: longitudinal evidence from a birth cohort. *Archives of General Psychiatry* 53: 1033–9.

Caspi A, Sugden K, Moffitt TE, et al. 2003. Influence of life stress on depression: moderation by a polymorphism in the 5-HTT gene. *Science* 301(5631): 291−3.

Cavanagh JT, Owens DG, Johnstone EC. 1999a. Life events in suicide and undetermined death in south-east Scotland: a case-control study using the method of psychological autopsy. *Social Psychiatry and Psychiatric Epidemiology* 34(12): 645−50.

Cavanagh JT, Owens, DG, Johnstone EC. 1999b. Suicide and undetermined death in south east Scotland: a case-control study using the psychological autopsy method. *Psychological Medicine* 29(5): 1141−9.

Cavanagh JTO, Carson AJ, Sharpe M, et al. 2003. Psychological autopsy studies of suicide: a systematic review. *Psychological Medicine* 33: 395−405.

CDC. 2003.Data and Statistics. www.cdc.gov/scientific.htm Accessed 22 May 2003.

Cheng ATA. 1995. Mental illness and suicide: a case-control study in East Taiwan. *Archives of General Psychiatry* 52: 594−603.

Cheng ATA, Chen THH, Chen C-C, et al. 2000. Psychosocial and psychiatric risk factors for suicide: case-control psychological autopsy study. *British Journal of Psychiatry* 177: 360−5.

Child, Youth and Family. 2005. *Towards Well-Being Youth Suicide Prevention Programme: Request for proposal.* Tender Document. Wellington: Child, Youth and Family.

Clark D, Clark S. 1993. Suicide among the elderly. In: K Bohme, R Freytag, C Vachtler, et al (eds). *Suicidal Behavior: The state of the art: Proceedings of the International Association for Suicide Prevention.* Regensburg, Germany: Roderer.

Conroy DL. 1993. Narcissistic crises of aging and suicidal despair (comment). *Suicide and Life-Threatening Behavior* 23(1): 21−6Clark DC. 1994. Narcissistic crises of aging and suicidal despair. *Suicide and Life-Threatening Behavior* 24(1): 105−10.

Cocarro EF, Siever LJ, Klar HM, et al. 1989 Serotonergic studies in patients with affective and personality disorders: correlates with suicidal and impulsive aggressive behaviour. *Archives of General Psychiatry* 46: 587−99.

Collings S, Blakely T, Atkinson J, et al. 2005. *Suicide Trends and Social Factors − New Zealand 1981 to 1999: Analyses from the New Zealand Census − Mortality Study.* Wellington: Ministry of Health.

Colson CE. 1972. Neuroticism, extraversion and repression: sensitization in suicidal college students. *British Journal of Social and Clinical Psychology* 11: 88−9.

Conner KR, Beautrais AL, Conwell Y. 2003. Risk factors for suicide and medically serious suicide attempts among alcoholics: analyses of Canterbury Suicide Project Data. *Journal of Studies on Alcohol* 64: 551−4.

Conner KR, Chiapella P. 2004. Alcohol and suicidal behavior: overview of a research workshop. *Alcoholism: Clinical and Experimental Research* 28(5): 2S−5S.

Conner KR, Duberstein PR, Conwell Y, et al. 2001. Psychological vulnerability to completed suicide: a review of empirical studies. *Suicide and Life-Threatening Behavior* 31(4): 367−85.

Conwell Y. 2001. Suicide in later life: a review and recommendations for prevention. *Suicide and Life-Threatening Behavior* 31(Suppl): S32−47.

Costello EJ, Pine DS, Hammen C, et al. 2002. Development and natural history of mood disorders. *Biological Psychiatry* 52(6): 529−42.

Davis NJ. 1999. *Resiliency: Status of the research and research-based programs*. Working paper draft. Washington DC, USA: Substance Abuse and Mental Health Services Administration, Center for Mental Health Services.

De Hert M, McKenzie K, Peuskens J. 2001. Risk factors for suicide in young people suffering from schizophrenia: a long-term follow-up study. *Schizophrenia Research* 47(2−3): 127−34.

de Wilde EJ, Kienhorst ICWM, Diekstra RFW, et al. 1992. The relationship between adolescent suicidal behavior and life events in childhood and adolescence. *American Journal of Psychiatry* 149(1): 45−51.

de Wilde E, Kienhorst ICWM, Diekstra RFW, et al. 1993. The specificity of psychological characteristics of adolescent suicide attempters. *Journal of the American Academy of Child and Adolescent Psychiatry* 32(1): 51−9.

Deavoll BJ, Mulder RT, Beautrais AL, et al. 1993. One hundred years of suicide in New Zealand. *Acta Psychiatrica Scandinavica* 87: 81−5.

Department of Health [London]. 2001. *Safety First: Five-year report of the National Confidential Inquiry into Suicide and Homicide by People with Mental Illness*. London: Department of Health.

Diekstra RFW, Kienhorst ICWM, de Wilde EJ. 1995. Suicide and suicidal behaviour among adolescents. In: M Rutter, DJ Smith (eds). *Psychosocial Disorders in Young People: Time trends and their causes* (pp. 686−761). Chichester: John Wiley and Sons Ltd.

Duberstein PR. 1995. Openness to experience and completed suicide across the second half of life. *International Psychogeriatrics* 7(2): 183−98.

Duberstein PR. 2001. Are closed-minded people more open to the idea of killing themselves? *Suicide and Life-Threatening Behavior* 31(1): 9−14.

Dubow EF, Kausch DF, Blum MC, et al. 1989. Correlates of suicidal ideation and attempts in a community sample of junior high and high school students. *Journal of Clinical Child Psychology* 18(2): 158−66.

Durie MH. 1977. Maori attitudes to sickness, doctors and hospitals. *New Zealand Medical Journal* 86: 483−5.

Durie MH. 1998. *Whaiora: Māori health development* (2nd ed). Auckland: Oxford University Press.

Durie MH. 2001a. Hazardous environments old and new: challenges for health protection. *New Zealand Journal Environmental Health* 24(4): 6–9.

Durie MH. 2001b. *Mauri Ora: The dynamics of Māori health*. Auckland: Oxford, University Press.

Eaves L, Eysenck H. 1975. The nature of extraversion: a genetical analysis. *Journal of Personality and Social Psychology* 32(1): 102−12.

Eckersley R, Dear K. 2002. Cultural correlates of youth suicide. *Social Science and Medicine* 55(11): 1891−904.

Ernst C, Lalovic A, Lesage A, et al. 2004. Suicide and no axis I psychopathology. *BMC Psychiatry* 4: 7.

Eysenck HJ. 1976. *The Measurement of Personality*. Baltimore, MD: University Park Press.

Farberow NL, Shneidman ES. 1970. Suicide among patients with malignant neoplasms. In: ES Shneidman, NL Farberow, RE Litman (eds). *The Psychology of Suicide* (pp. 325−44). New York: Science House.

Ferguson S, Blakely T, Allan B, et al. 2003. *Exploring Associations with Social and Economic Factors*. Wellington: Department of Public Health and Psychological Medicine. Public Health Monograph Series No. 10.

Fergusson DM, Beautrais AL, Horwood LJ. 2003. Vulnerability and resiliency to suicidal behaviours in young people. *Psychological Medicine* 33: 61−73.

Fergusson DM, Horwood LJ, Beautrais AL. 1999. Is sexual orientation related to mental health problems and suicidality in young people? *Archives of General Psychiatry* 56: 876−80.

Fergusson DM, Horwood LJ, Lynskey MT. 1997. The effects of unemployment on psychiatric illness during young adulthood. *Psychological Medicine* 27(2): 371−81.

Fergusson DM, Horwood LJ, Woodward LJ. 2001. Unemployment and psychosocial adjustment in young adults: causation or selection? *Social Science and Medicine* 53(3): 305−20.

Fergusson DM, Lynskey MT. 1995a. Childhood circumstances, adolescent adjustment, and suicide attempts in a New Zealand birth cohort. *Journal of the American Academy of Child and Adolescent Psychiatry* 34: 612−22.

Fergusson DM, Lynskey MT. 1995b. Suicide attempts and suicidal ideation in a birth cohort of 16-year-old New Zealanders. *Journal of the American Academy of Child and Adolescent Psychiatry* 34(10): 1308−17.

Fergusson DM, Woodward LJ, Horwood LJ. 2000. Risk factors and life processes associated with the onset of suicidal behaviour during adolescence and early adulthood. *Psychological Medicine* 30: 23−39.

Finau SA. 1982. Social anthropology: the Tongan family: relevance to health. *New Zealand Medical Journal* 95: 880−3.

Finau SA. 1994. The value of Pacific children: perspectives for a way forward. *Pacific Health Dialog* 1(2): 52−62.

Finau SA, Lasalo P. 1985. Suicide and parasuicide in paradise. *New Zealand Family Physician* 12: 101−4.

Foster T, Gillespie K, McClelland R, et al. 1999. Risk factors for suicide independent of DSM-III-R axis I disorder: case-control psychological autopsy study in Northern Ireland. *British Journal of* Psychiatry 175(Aug): 175−9.

Frances RJ, Franklin J, Flavin DK. 1986. Suicide and alcoholism. *Annals of the New York Academy of Sciences* 487: 316−26.

Fruehwald S, Matschnig T, Koenig F, et al. 2004. Suicide in custody: case-control study. *British Journal of Psychiatry* 185(6): 494−8.

Fu Q, Heath AC, Bucholz KK, et al. 2002. A twin study of genetic and environmental influences on suicidality in men. *Psychological Medicine* 32: 11−24.

Gairin I, House A, Owens D. 2003. Attendance at the accident and emergency department in the year before suicide: retrospective study. *British Journal of Psychiatry* 183: 28−33.

Garfinkel BD, Froese A, Hood J. 1982. Suicide attempts in children and adolescents. *American Journal of Psychiatry* 139(10): 1257−61.

Gibb SJ, Beautrais AL. 2004. Epidemiology of attempted suicide in Canterbury 1993−2002. *New Zealand Medical Journal* 1205: 1−9.

Gibb SJ, Beautrais AL, Fergusson DM. 2005. Mortality and further suicidal behaviour after an index suicide attempt: a 10 year study. *Australian and New Zealand Journal of Psychiatry* 39: 95–100.

Goldney RD. 1982. Locus of control in young women who have attempted suicide. *Journal of Nervous and Mental Disease* 170(4): 198−201.

Goldney RD. 2004. Suicide research based on Danish registers. *Crisis: Journal of Crisis Intervention and Suicide* 25(4): 189−90.

Goldney RD, Schioldann JA. 2000. Pre-Durkheim Suicidology. *Crisis* 21: 181−6.

Goldney RD, Schioldann JA. 2001. Pre-Durkheim Suicidology. In: Grad O (ed). *Suicide Risk and Protective Factors in the New Millennium* (pp. 21–25). Ljubljana: Cankarjev dom.

Goldney RD, Schioldann JA. 2002. *Pre-Durkheim Suicidology. The 1892 Reviews of Tuke and Savage.* Adelaide Academic Press.

Goldney RD, Schioldann JA. 2004. Evolution of the concept of altruistic suicide in Pre-Durkheim Suicidology. *Archives of Suicide Research* 8: 23–7.

Goldney RD, Wilson D, Dal Grande E, et al. 2000. Suicidal ideation in a random community sample: attributable risk due to depression and psychosocial and traumatic events. *Australian and New Zealand Journal of Psychiatry* 34(1): 98−106.

Goodwin FK, Jamison KR. 1990. *Manic-Depressive Illness*. New York: Oxford University Press.

Goodwin R, Beautrais AL, Fergusson DM. 2004. Familial transmission of suicidal ideation and suicide attempts: evidence from a general population sample. *Psychiatry Research* 126(2): 159−65.

Gould MS, Fisher P, Shaffer D, et al. 1996. Psychosocial risk factors of child and adolescent completed suicide. *Archives of General Psychiatry* 53(12): 1155−62.

Gould MS, Greenberg T, Velting, et al. 2003. Youth suicide risk and preventive interventions: a review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry* 42(4): 386−405.

Gould MS, Shaffer D, Fisher P, et al. 1998. Separation/divorce and child and adolescent completed suicide. *Journal of the American Academy of Child and Adolescent Psychiatry* 37(2):155−62.

Groholt B, Ekeberg O, Wichstrom L, et al. 1998. Suicide among children and younger and older adolescents in Norway: a comparative study. *Journal of the American Academy of Child and Adolescent Psychiatry* 37(5): 473−81.

Groholt B, Ekeberg O, Wichstrom L, et al. 2000. Young suicide attempters: a comparison between a clinical and an epidemiological sample. *Journal of the American Academy of Child and Adolescent Psychiatry* 39(7): 868−75.

Grossman DC, Milligan BC, Deyo RA. 1991. Risk factors for suicide attempts among Navajo adolescents. *American Journal of Public Health* 81(7): 870–4.

Guiao IZ, Esparza D. 1995. Suicidality correlates in Mexican American teens. *Issues in Mental Health Nursing* 16(5): 461−79.

Gunderson JG, Sabo AN. 1993. The phenomenological and conceptual interface between borderline personality disorder and PTSD. *American Journal of Psychiatry* 150(1): 19−27.

Gunnell D, Magnusson PKE, Rasmussen F. 2005. Low intelligence test scores in 18 year old men and risk of suicide: cohort study. *British Medical Journal* 330: 167−71.

Gunnell DJ, Peters TJ, Kammerling RM, et al. 1995. Relation between parasuicide, suicide, psychiatric admissions, and socioeconomic deprivation. *British Medical Journal* 311: 226−30.

Guohua L. 1995. The interaction effect of bereavement and sex on the risk of suicide in the elderly: a historical cohort study. *Social Science and Medicine* 40: 825−8.

Guze SB, Robins E. 1970. Suicide and primary affective disorders. *American Journal of Psychiatry* 117: 437−8.

Haberlandt W. 1965. Der suizid als genetisches problem (zwillings and famiien anayse). *Anthropol Anz* 29: 65−89.

Hagnell O, Lanke J, Rorsman B. 1981. Suicide rates in the Lundby study: mental illness as a risk factor for suicide. *Neuropsychobiology* 7(5): 248−53.

Harkavy-Friedman JM, Asnis GM, Boeck M, et al. 1987. Prevalence of specific suicidal behaviors in a high school sample. *American Journal of Psychiatry* 144(9): 1203−6.

Harris EC, Barraclough B. 1997. Suicide as an outcome for mental disorders. *British Journal of Psychiatry* 170: 205−8.

Harris EC, Barraclough BM. 1998. Excess mortality of mental disorder. *British Journal of Psychiatry* 173: 11−53.

Harwood D, Hawton K, Hope T, et al. 2001. Psychiatric disorder and personality factors associated with suicide in older people: a descriptive and case-control study. *International Journal of Geriatric Psychiatry* 16: 155−65.

Harwood D, Jacoby R. 2000. Suicide behaviour among the elderly. In: K Hawton, K van Heeringen (eds). *The International Handbook of Suicide and Attempted Suicide* (pp. 275−91). New York: John Wiley and Sons Ltd.

Hassall I. 1997. Why are so many young people killing themselves? *Butterworths Family Law Journal* 2(7): 153−8.

Hawton K. 2000. Sex and suicide: gender differences in suicidal behaviour. *British Journal of Psychiatry* 177: 484−5.

Hawton K, Fagg J. 1988. Suicide, and other causes of death, following attempted suicide. *British Journal of Psychiatry* 152: 359−66.

Hawton K, Simkin S, Malmberg A, et al. 1998. *Suicide and Stress in Farmers*. London: The Stationery Office.

Hawton K, Townsend E, Arensman E, et al. 2000. Psychosocial versus pharmacological treatments for deliberate self harm. *Cochrane Database of Systematic Reviews* 2: CD001764.

Hawton K, van Heeringen K. 2000. *The International Handbook of Suicide and Attempted Suicide*. New York: John Wiley and Sons Ltd.

Hawton K, Zahl D, Weatherall R. 2003. Suicide following deliberate self-harm: long-term follow-up of patients who presented to a general hospital. *British Journal of Psychiatry* 182: 537−42.

Haycock J. 1993. Comparative suicide rates in different types of involuntary confinement. *Medicine, Science and the Law* 33: 128−36.

Hayes LM, Rowan JR. 1988. *National Study of Jail Suicides: Seven years later*. Washington, DC: National Center for Institutions and Alternatives.

Heikkinen M, Aro H, Lonnqvist J. 1993. Life events and social support in suicide. *Suicide and Life-Threatening Behavior* 23(4): 343−58.

Heikkinen M, Aro H, Lonnqvist J. 1994. Recent life events, social support and suicide. *Acta Psychiatrica Scandinavica* 377: 65−72.

Heikkinen ME, Isometsa ET, Aro HM, et al. 1995. Age-related variation in recent life events preceding suicide. *Journal of Nervous and Mental Disease* 183(5): 325−31.

Heikkinen ME, Isometsa ET, Marttunen MJ, et al. 1995. Social factors in suicide. *British Journal of Psychiatry* 167: 747−53.

Heim C, Nemeroff CB. 2001. The role of childhood trauma in the neurobiology of mood and anxiety disorders: preclinical and clinical studies. *Biological Psychiatry* 49(12): 1023−39.

Henriksson M, Aro HM, Marttunen MJ, et al. 1993. Mental disorders and comorbidity in suicide. *American Journal of Psychiatry* 150(6): 935−40.

Henriksson MM, Marttunen MJ, Isometsa ET, et al. 1995. Mental disorders in elderly suicide. *International Psychogeriatrics* 7(2): 275−86.

Herrell R, Goldberg J, True WR, et al. 1999. Sexual orientation and suicidality: a co twin control study in adult men. *Archives of General Psychiatry* 56: 867−74.

Hirini P, Collings S. 2005. *Whakamomori: He whakaaro, he korero noa: A collection of contemporary views on Maori and suicide*. Wellington: Ministry of Health.

Hovey JD, King CA. 1997. Suicidality among acculturating Mexican Americans: current knowledge and directions for research. *Suicide and Life Threatening Behavior* 27(1): 92−103.

Hovey JD. 2000a. Acculturative stress, depression, and suicidal ideation among Central American immigrants. *Suicide and Life-Threatening Behavior* 30(2): 125−39.

Hovey JD. 2000b. Acculturative stress, depression, and suicidal ideation in Mexican immigrants. *Cultural Diversity and Ethnic Minority Psychology* 6(2): 134−51.

Howden-Chapman P, Hales S, Chapman R, et al. 2005. *The Impact of Economic Recession on Youth Suicide: A comparison of New Zealand and Finland*. Wellington: Ministry of Health.

Hoyer G, Lund E. 1993. Suicide among women related to number of children in marriage. *Archives of General Psychiatry* 50: 134−7.

Iacono WG, Carlson SR, Taylor J, et al. 1999. Behavioral disinhibition and the development of substance-use disorders: findings from the Minnesota Twin Family Study. *Development and Psychopathology* 11(4): 869−900.

Indian Health Service. 1999. *Trends in Indian Health, 1998–1999*. Rockville, MD: US Department of Health and Human Services.

Institute of Medicine. 2002. *Reducing Suicide: A national imperative*. Washington, DC: The National Academies Press.

Isacsson G. 2000. Suicide prevention: a medical breakthrough? *Acta Psychiatrica Scandinavica* 102: 113−17.

Isacsson G, Bergman U, Rich CL. 1994. Antidepressants, depression and suicide: an analysis of the San Diego study. *Journal of Affective Disorders* 32: 277−86.

Isacsson G, Rich CL. 2003. Getting closer to suicide prevention. *British Journal of Psychiatry* 182:457−8.

Isometsa ET, Henriksson MM, Heikkinen ME, et al. 1996. Suicide among subjects with personality disorders. *American Journal of Psychiatry* 153(5): 667−73.

Jacobs DG, Baldessarini RJ, Conwell Y, et al. 2003. *Practice Guideline for the Assessment and Treatment of Patients with Suicidal Behaviors.* Arlington (VA), USA: American Psychiatric Association.

Jenkins R. 2002. Addressing suicide as a public-health problem. *Lancet* 359(9309): 813−14.

Jenkins R, Singh B. 2000. General population strategies of suicide prevention. In: K Hawton, K van Heeringen (eds). *The International Handbook of Suicide and Attempted Suicide* (pp. 597−615). New York: John Wiley and Sons Ltd.

Joffe RT, Offord DR, Boyle MH. 1988. Ontario Child Health Study: Suicidal behavior in youth age 12−16 years. *American Journal of Psychiatry* 145(11): 1420−3.

Johansson LM, Sundquist J, Johansson SE, et al. 1997. Ethnicity, social factors, illness and suicide: a follow-up study of a random sample of the Swedish population. *Acta Psychiatrica Scandinavica* 95(2): 125−31.

Joiner TE Jr, Steer RA, Abramson LY, et al. 2001. Hopelessness depression as a distinct dimension of depressive symptoms among clinical and non-clinical samples. *Behaviour Research and Therapy* 39(5): 523−36.

Juel-Nielsen N, Videbech T. 1970. A twin study of suicide. *Acta Geneticae Medicae et Gemellologiae* 19(1): 307−10.

Juon HS, Ensminger ME. 1997. Childhood, adolescent, and young adult predictors of suicidal behaviors: a prospective study of African Americans. *Journal of Child Psychology and Psychiatry and Allied Disciplines* 38(5): 553−63.

Kaplan KJ, Harrow M. 1996. Positive and negative symptoms as risk factors for later suicidal activity in schizophrenics versus depressives. *Suicide and Life-Threatening Behavior* 26(2): 105−21.

Kashden J, Fremouw WJ, Callahan TS, et al. 1993. Impulsivity in suicidal and non-suicidal adolescents. *Journal of Abnormal Child Psychology* 21(3): 339−53.

Kelly S, Bunting J. 1998. Trends in suicide in England and Wales, 1982−96. *Population Trends* 92(Summer): 29−41.

Kendler KS. 1997. Social support: a genetic-epidemiologic analysis. *American Journal of Psychiatry* 154(10): 1398−1404.

Kendler KS, Davis CG, Kessler RC. 1997. The familial aggregation of common psychiatric and substance use disorders in the National Comorbidity Survey: a family history study. *British Journal of Psychiatry* 170: 541−8.

Kerkhof AJFM, Bernasco W. 1990. Suicidal behavior in jails and prisons in the Netherlands: incidence, characteristics, and prevention. *Suicide and Life-Threatening Behavior* 20(2): 123−37.

Kessler RC. 1995. Epidemiology of psychiatric comorbidity. In: MT Tsuang, M Tohen, GEP Zahner (eds). *Textbook in Psychiatric Epidemiology* (pp. 179−97). New York: John Wiley and Sons Ltd.

Kessler RC. 2000. Posttraumatic stress disorder: the burden to the individual and to society. *Journal of Clinical Psychiatry* 61(Suppl 5): S4−12; discussion S13−14.

Kessler RC, Borges G, Walters EE. 1999. Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey. *Archives of General Psychiatry* 56: 617−26.

Kettl PA, Bixler EO. 1991. Suicide in Alaska natives, 1979−1984. *Psychiatry* 54(1): 55−63.

Kety SS. 1986. Genetic factors in suicide. In: A Roy (ed). *Suicide* (pp. 41−5). Baltimore, MD: Williams and Wilkins.

Khan A, Leventhal RM, Khan S, et al. 2002. Suicide risk in patients with anxiety disorders: a meta-analysis of the FDA database. *Journal of Affective Disorders* 68(2−3): 183−90.

Kienhorst CWM, de Wilde EJ, Diekstra RFW, et al. 1992. Differences between adolescent suicide attempters and depressed adolescents. *Acta Psychiatrica Scandinavica* 85: 222−8.

Klimek V, Stockmeier C, Overholser J, et al. 1997. Reduced levels of norepinephrine transporters in the locus coeruleus in major depression. *Journal of Neuroscience* 17(21): 8451−8.

Knox KL, Conwell Y, Caine ED. 2004. If suicide is a pubic health problem, what are we doing to prevent it? *American Journal of Public Health* 94(1): 37−45.

Kosky R, Silburn S, Zubrick SR. 1990. Are children and adolescents who have suicidal thoughts different from those who attempt suicide? *Journal of Nervous and Mental Disease* 178(1): 38−43.

Kotler M, Iancu I, Efroni R, et al. 2001. Anger, impulsivity, social support, and suicide risk in patients with post-traumatic stress disorder. *Journal of Nervous and Mental Disease* 189(3): 162−7.

Kposowa AJ. 1999. Suicide mortality in the United States: differentials by industrial and occupational groups. *American Journal of Industrial Medicine* 36(6): 645−52.

Kposowa AJ. 2000. Marital status and suicide in the National Longitudinal Mortality Study. *Journal of Epidemiology and Community Health* 54(4): 254−61.

Kreitman N. 1977. *Parasuicide*. London: John Wiley and Sons Ltd.

Kreitman N, Platt S. 1984. Suicide, unemployment, and domestic gas detoxification in Britain. *Journal of Epidemiology and Community Health* 38: 1−6.

Krug EG, Dahlberg LL, Mercy JA, et al. 2002. *World Report on Violence and Health*. Geneva: World Health Organization.

La Vecchia C, Lucchini F, Levi F. 1994. Worldwide trends in suicide mortality, 1955−1989. *Acta Psychiatrica Scandinavica* 90(1): 53−64.

Langley J, Stephenson S. 2001. Suicide and occupation in New Zealand. *Journal of Occupational Health and Safety Australia and New Zealand* 17(4): 363−70.

Lawson Te Aho, K. 1998. *Kia Piki te Ora o te Taitamariki: A review of evidence.* Wellington: Te Puni Kōkiri.

Lee S. 2000. In China, suicide in young women is a problem too. *British Medical Journal* 321: 636.

Lesage AD, Boyer R, Grunberg F, et al. 1994. Suicide and mental disorders: a case-control study of young men. *American Journal of Psychiatry* 151(7): 1063−8.

Lester D. 2000. Religious homogeneity and suicide. *Psychological Reports* 87(3 pt 1): 766.

Lewis G, Sloggett A. 1998. Suicide, deprivation, and unemployment: record linkage study. *British Medical Journal* 317: 1283−6.

Linehan MM, Rizvi SL, Welch SS, et al. 2000. Psychiatric aspects of suicidal behaviour: personality disorders. In: K Hawton, K van Heeringen (eds). *The International Handbook of Suicide and Attempted Suicide* (pp. 147−78). New York: John Wiley and Sons Ltd.

Loehlin JC. 1982. Are personality traits differentially heritable? *Behavior Genetics* 12(4): 417−28.

Lonnqvist JK. 2000. Psychiatric aspects of suicidal behaviour: depression. In: K Hawton, K van Heeringen (eds). *The International Handbook of Suicide and Attempted Suicide* (pp. 107−20). New York: John Wiley and Sons Ltd.

Ludwig AM. 1994. Mental illness and creative activity in female writers. *American Journal of Psychiatry* 151(11): 1650−6.

Luoma JB, Pearson JL. 2002. Suicide and marital status in the United States, 1991−1996: is widowhood a risk factor? *American Journal of Public Health* 92(9): 1518−22.

Luthar SS. 1999. Measurement issues in the empirical study of resilience: an overview. In: M Glanz, JL Johnson (eds). *Resilience and Development: Positive life adaptions* (pp. 129−60). New York: Plenum.

Luthar SS. 2003. *Resilience and Vulnerability: Adaptation in the context of childhood adversities*. Cambridge: Cambridge University Press.

Luthar SS, Cicchetti D. 2000. The construct of resilience: implications for interventions and social policies. *Development and Psychopathology* 12: 857−85.

Luthar SS, Cicchetti D, Becker B. 2000. The construct of resilience: a critical evaluation and guidelines for future work. *Child Development* 71(3): 543−62.

MacMahon B, Pugh TF. 1965. Suicide in the widowed. *American Journal of Epidemiology* 81(1): 23−31.

Magne-Ingvar U, Ojehagen A, Traskman-Bendz L. 1992. The social network of people who attempt suicide. *Acta Psychiatrica Scandinavica* 86: 153−8.

Mahina O. 2002. Atamai, fakakaukau and vale: 'mind', 'thinking' and 'mental illness' in Tonga. *Pacific Health Dialog* 9: 303−9.

Malone KM, Corbitt EM, Li S, et al. 1996. Prolactin response to fenfluramine and suicide attempt lethality in major depression. *British Journal of Psychiatry* 168(3): 324−9.

Mann JJ. 1987. Psychobiologic predictors of suicide. *Journal of Clinical Psychiatry* 48(Suppl): S39−43.

Mann JJ. 1995. Violence and aggression. In: FE Bloom, DJ Kupfer (eds). *Psychopharmacology: The fourth generation of progress* (pp. 1919−28). New York: Raven Press.

Mann JJ. 2003. Neurobiology of suicidal behaviour. *Nature Reviews/Neuroscience* 4: 819−28.

Mann, JJ, Brent DA, Arango V. 2001. The neurobiology and genetics of suicide and attempted suicide: a focus on the serotonergic system. *Neuropsychopharmacology* 24(5): 467−77.

Mann, JJ, Malone KM, Diehl DJ, et al. 1996. Demonstration in vivo of reduced serotonin responsivity in the brain of untreated depressed patients. *American Journal of Psychiatry* 153(2): 174−82.

Mann JJ, Oquendo M, Underwood MD, et al. 1999. The neurobiology of suicide risk: a review for the clinician. *Journal of Clinical Psychiatry* 60(Suppl 2): 7−11.

Mann JJ, Stanley M, McBride PA, et al. 1986. Increased serotonin2 and B-adrenergic receptor binding in the frontal cortices of suicide victims. *Archives of General Psychiatry* 43: 954−9.

Mann JJ, Waternaux C, Haas GL, et al. 1999. Toward a clinical model of suicidal behavior in psychiatric patients. *American Journal of Psychiatry* 156(2): 181−9.

Maris RW. 1969. *Social Forces in Urban Suicide*. Homewood, Ill: Dorsey Press.

Maris RW. 1981. *Pathways to Suicide: A survey of self-destructive behaviors*. Baltimore: Johns Hopkins University Press.

Maris RW, Berman AL, Silverman MM. 2000. *Comprehensive Textbook of Suicidology*. New York: The Guilford Press.

Martin G, Rozanes P, Pearce C, et al. 1995. Adolescent suicide, depression and family dysfunction. *Acta Psychiatrica Scandinavica* 92: 336−44.

Marttunen MJ, Aro HM, Lonnqvist JK. 1992. Adolescent suicide: endpoint of long-term difficulties. *Journal of the American Academy of Child and Adolescent Psychiatry* 31(2): 649−54.

Marttunen MJ, Aro HM, Lonnqvist JK. 1993. Precipitant stressors in adolescent suicide. *Journal of the American Academy of Child and Adolescent Psychiatry* 32(6): 1178−83.

Maskill C, McClellan GM, Hodges I, et al 2005. *Explaining Patterns of Suicide: A selective review of studies examining social, economic, cultural and other population-level influences*. Wellington: Ministry of Health.

Masten AS. 1999. Resilience comes of age: reflections on the past and outlook for the next generation of research. In: MD Glantz, JG Johnson (eds). *Resilience and Development: Positive life adaptations* (pp. 281−96). New York: Pergamon Press.

Masten AS. 2001. Ordinary magic: resilience processes in development. *American Psychologist* 56(3): 227−38.

Masten AS, Coatsworth JD. 1998. The development of competence in favorable and unfavorable environments: lessons from research on successful children. *American Psychologist* 53(2): 205−20.

Masten AS, Powell JL. 2003. A resilience framework for research, policy, and practice. In: SS Luthar (ed). *Resilience and Vulnerability: Adaptation in the context of childhood adversities* (pp. 1−25). Cambridge: Cambridge University Press.

McDaniel JS, Purcell D, D'Augelli AR. 2001. The relationship between sexual orientation and risk for suicide: research findings and future directions for research and prevention. *Suicide and Life-Threatening Behavior* (31 Suppl): S84−105.

Mehlum L. 2001. Suicidal behaviour and personality disorder. *Current Opinion in Psychiatry* 14: 131−5.

Meltzer HY, Okayli G. 1995. Reduction of suicidality during clozapine treatment of neuroleptic-resistant schizophrenia: impact on risk-benefit assessment. *American Journal of Psychiatry* 152(2): 183−90.

Meltzer HY, Umberkoman-Wiita B, Robertson A, et al. 1984. Effect of 5-hydroxytryptophan on serum cortisol levels in major affective disorders. I: Enhanced response in depression and mania. *Archives of General Psychiatry* 41(4): 366−74.

Meyer JM, Rutter M, Silberg JL, et al. 2000. Familial aggregation for conduct disorder symptomatology: the role of genes, marital discord and family adaptability. *Psychological Medicine* 30(4): 759−74.

Middleton N, Gunnell D, Frankel S, et al. 2003. Urban-rural differences in suicide trends in young adults: England and Wales, 1981−1998. *Social Science and Medicine* 57: 1183−94.

Milos G, Spindler A, Hepp U, et al. 2004. Suicide attempts and suicidal ideation: links with psychiatric comorbidity in eating disorder subjects. *General Hospital Psychiatry* 26(2): 129−35.

Ministry of Health. 1997. *Making a Pacific Difference: Strategic initiatives for the health of Pacific people in New Zealand.* Wellington: Ministry of Health.

Ministry of Health. 2001a. *Refugee Health Care: A handbook for health professionals*. New Zealand: Ministry of Health.

Ministry of Health. 2001b. *Suicide Trends in New Zealand 1978−1998.* Wellington: New Zealand Health Information Service.

Ministry of Youth Affairs, Ministry of Health, Te Puni Kōkiri. 1998. *New Zealand Youth Suicide Prevention Strategy.* Wellington: Ministry of Youth Affairs, Ministry of Health, Te Puni Kōkiri.

Molnar BE, Berkman LF, Buka SL. 2001. Psychopathology, childhood sexual abuse and other childhood adversities: relative links to subsequent suicidal behaviour in the US. *Psychological Medicine* 31: 965−77.

Molnar BE, Buka SL, Kessler RC. 2001. Child sexual abuse and subsequent psychopathology: results from the National Comorbidity Survey. *American Journal of Public Health* 91(5): 753−60.

Monroe SM, Simons AD. 1991. Diathesis-stress theories in the context of life stress research: implications for the depressive disorders. *Psychological Bulletin* 110(3): 406−25.

Morano CD, Cisler RA, Lemerond J. 1993. Risk factors for adolescent suicidal behavior: loss, insufficient familial support, and hopelessness. *Adolescence* 28(112): 851−64.

Morrell SL, Taylor RJ, Kerr CB. 1998. Jobless: unemployment and young people's health. *Medical Journal of Australia* 168: 236−40.

Morrison S. 1996. Custodial suicide in Australia: a comparative study of different populations. *Medical Science and the Law* 36(2): 167−77.

Mortensen PB, Agerbo E, Erikson T, et al. 2000. Psychiatric illness and risk factors for suicide in Denmark. *Lancet* 355(9197): 9−12.

Moscicki EK. 2001. Epidemiology of completed and attempted suicide: toward a framework for prevention. *Clinical Neuroscience Research* 1: 310−23.

Murphy GE. 2000. Psychiatric aspects of suicidal behaviour: substance abuse. In: K Hawton, K van Heeringen (eds). *The International Handbook of Suicide and Attempted Suicide* (pp. 135−46). New York: John Wiley and Sons Ltd.

Murphy SL. 2000. Deaths: final data for 1998. *National Vital Statistics Reports* 48(11): 1−105.

NZHIS (New Zealand Health Information Service). 2004. *Mortality and Demographic Data 2001*. Wellington: Ministry of Health.

NZHIS (New Zealand Health Information Service). 2004. *Health Statistics: Suicide-allages*. www.nzhis.govt.nz/stats/suicidefacts1.html.

Ordway GA. 1997. Pathophysiology of the locus coeruleus in suicide. *Annals of the New York Academy of Sciences* 836: 233−52.

Ordway GA, Smith KS, Haycock JW. 1994. Elevated tyrosine hydroxylase in the locus coeruleus of suicide victims. *Journal of Neurochemistry* 62(2): 680−5.

Ordway GA, Widdowson PS, Smith KS, et al. 1994. Agonist binding to alpha 2-adrenoceptors is elevated in the locus coeruleus from victims of suicide. *Journal of Neurochemistry* 63(2): 617−24.

Ostamo A, Lonnqvist J. 2001. Excess mortality of suicide attempters. *Social Psychiatry and Psychiatric Epidemiology* 36(1): 29−35.

Owens D, Horrocks J, House A. 2002. Fatal and non-fatal repetition of self-harm: systematic review. *British Journal of Psychiatry* 181: 193−9.

Pallis DJ, Jenkins JS. 1977. Extraversion, neuroticism, and intent in attempted suicides. *Psychological Reports* 41: 19−22.

Paris J. 1998. Does childhood trauma cause personality disorders in adults? *Canadian Journal of Psychiatry* 43(2): 148−53.

Pearce CM, Martin G. 1993. Locus of control as an indicator of risk for suicidal behaviour among adolescents. *Acta Psychiatrica Scandinavica* 88: 409−14.

Pearson JL, Conwell Y. 1995. Suicide in late life: challenges and opportunities for research. *International Psychogeriatrics* 7(2): 131−6.

Pederson AM, Tefft MA, Babigian HM. 1975. Risk of mortality of suicide attempters compared with psychiatric and general populations. *Suicide* 5: 145−57.

Pederson NL, Plomin R, McClearn GE, et al. 1988. Neuroticism, extraversion, and related traits in adult twins reared apart and reared together. *Journal of Personality and Social Psychology* 55: 950−7.

Pescosolido BA, Georgianna S. 1989. Durkheim, suicide, and religion: toward a network theory of suicide. *American Sociological Review* 54(1): 33−48.

Pfeffer CR, Klerman GL, Hurt SW, et al. 1993. Suicidal children grow up: rates and psychosocial risk factors for suicide attempts during follow-up. *Journal of the American Academy of Child and Adolescent Psychiatry* 32(1): 106−13.

Pfeffer CR, Klerman GL, Hurt SW, et al. 1991. Suicidal children grow up: demographic and clinical risk factors for adolescent suicide attempts. *Journal of the American Academy of Child and Adolescent Psychiatry* 30(4): 609−16.

Pfeffer CR, Normandin L, Kakuma T. 1994. Suicidal children grow up: suicidal behavior and psychiatric disorders among relatives. *Journal of the American Academy of Child and Adolescent Psychiatry* 33(8): 1087−97.

Phillips MR, Yang G, Zhang Y, et al. 2002. Risk factors for suicide in China: a national case-control psychological autopsy study. *Lancet* 360: 1728−36.

Pirkis J, Burgess P, Dunt D. 2000. Suicidal ideation and suicide attempts among Australian adults. *Crisis: Journal of Crisis Intervention and Suicide* 21(1): 16−25.

Platt S, Hawton K. 2000. Suicidal behaviour and the labour market. In: K Hawton, K van Heeringen (eds). *The International Handbook of Suicide and Attempted Suicide* (pp. 309−84). New York: John Wiley and Sons Ltd.

Plutchik R. 1995. Outward and inward directed aggressiveness: the interaction between violence and suicidality. *Pharmacopsychiatry* 28(Suppl 2): S47−57.

Pōmare E, Keefe-Ormsby V, Ormsby C, et al. 1995. *Hauora: Māori standards of health III – A study of the years 1970–1991*. Wellington: Wellington School of Medicine.

Pompili M, Girardi P, Ruberto A, et al. 2004. Toward a new prevention of suicide in schizophrenia. *World Journal of Biological Psychiatry* 5(4): 201−10.

Presbyterian Support Services. Accessed 12.4.05. *Rural Stress: Discussion aids for self-help groups*. Christchurch: The Campbell Centre, Presbyterian Support Services (Christchurch).

Public Health Centre. 1995. *Progress on Health Outcome Targets: The state of the public health in New Zealand*. Wellington: Public Health Commission.

Pulotu-Endemann FK, Annandale M, Instone A. 2004. *A Pacific Perspective on the New Zealand Mental Health Classification and Outcomes Study (CAOS): Discussion paper*. Wellington: Mental Health Commission.

Qin P, Agerbo E, Mortensen PB. 2003. Suicide risk in relation to socioeconomic, demographic, psychiatric, and familial factors: a national register-based study of all suicides in Denmark, 1981−1997. *American Journal of Psychiatry* 160(4): 765−72.

Quinn J. 1999. Where need meets opportunity: youth development programs for early teens. *Future of Children* 9(2): 96−116.

Radomsky ED, Haas GL, Mann JJ, et al. 1999. Suicidal behavior in patients with schizophrenia and other psychotic disorders. *American Journal of Psychiatry* 156(10): 1590−5.

Resnick MD. 2000. Protective factors, resiliency, and healthy youth development. *Adolescent Medicine: State of the Art Reviews* 11(1): 157−64.

Resnick MD, Bearman PS, Blum WR, et al. 1997. Protecting adolescents from harm: findings from the National Longitudinal Study on Adolescent Health. *Journal of the American Medical Association* 278(10): 823−32.

Rich CL, Fowler RC, Fogarty LA, et al. 1988. San Diego suicide study. III: Relationships between diagnoses and stressors. *Archives of General Psychiatry* 45: 589−92.

Rich CL, Warsradt GM, Nemiroff RA, et al. 1991. Suicide, stressors, and the life cycle. *American Journal of Psychiatry* 148(4): 524−7.

Rich CL, Young D, Fowler RC. 1986. San Diego suicide study. I: Young vs old subjects. *Archives of General Psychiatry* 43(6): 577−82.

Rifai AH, George CJ, Stack JA, et al. 1994. Hopelessness in suicide attempters after acute treatment of major depression in late life. *American Journal of Psychiatry* 151(11): 1687−90.

Robins E, Murphy GE, Wilkinson RH Jr, et al. 1959. Some clinical considerations in the prevention of suicide based on a study of 134 successful suicides. *American Journal of Public Health* 49: 888−99.

Rose G. 1992. *The Strategy of Preventive Medicine*. Oxford: Oxford University Press.

Roy A. 1983. Family history of suicide. *Archives of General Psychiatry* 40(9): 971−4.

Roy A, Rylander G, Sarchiapone M. 1997. Genetics of suicide: family studies and molecular genetics. *Annals of the New York Academy of Sciences* 836: 135−57.

Roy A, Segal NL, Centerwall BS, et al. 1991. Suicide in twins. *Archives of General Psychiatry* 48(1): 29−32.

Rubenowitz E, Waern M, Wilhelmsson K, et al. 2001. Life events and psychosocial factors in elderly suicides: a case-control study. *Psychological Medicine* 31: 1193−202.

Rubenstein JL, Heeren T, Housman D, et al. 1989. Suicidal behavior in 'normal' adolescents: risk and protective factors. *American Journal of Orthopsychiatry* 59(1): 59−71.

Rutter M. 1985. Resilience in the face of adversity: protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry* 147: 598−611.

Rutter M. 2000. Resilience reconsidered: conceptual considerations, empirical findings, and policy implications. In: JP Shonkoff, SJ Meisels (eds). *Handbook of Early Intervention* (2nd ed) (pp. 651−81). New York: Cambridge University Press.

Rutter M, Smith DJ. 1995. *Psychosocial Disorders in Young People: Time trends and their causes*. Chichester: John Wiley and Sons Ltd.

Schmidt NB, Woolaway-Bickel K, Bates M. 2000. Suicide and panic disorder: integration of the literature and new findings. In: TE Joiner, MD Rudd (eds). *Suicide Science: Expanding the boundaries* (pp. 117−36). Norwell, MA: Kluwer Academic Publishers.

Shaffer D. 1974. Suicide in childhood and early adolescence. *Journal of Child Psychology and Psychiatry* 15: 275−91.

Shaffer D, Fisher P, Hicks RH, et al. 1995. Sexual orientation in adolescents who commit suicide. *Suicide and Life-Threatening Behavior* 25: 64−71.

Shaffer D, Gould MS, Fisher P, et al. 1996. Psychiatric diagnosis in child and adolescent suicide. *Archives of General Psychiatry* 53: 339−48.

Shaffer D, Pfeffer CR, Bernet W, et al. 2001. Practice parameters for the assessment and treatment of children and adolescents with suicidal behavior. *Journal of the American Academy of Child and Adolescent Psychiatry* 40(7): 24S−51S.

Shafii M, Steltz-Lenarsky J, Derrick AM, et al. 1988. Comorbidity of mental disorders in the post-mortem diagnosis of completed suicide in children and adolescents. *Journal of Affective Disorders* 15: 227−33.

Shneidman E. 1985. *Definition of Suicide*. New York: John Wiley and Sons Ltd.

Silverman AB, Reinherz HZ, Giaconia RM. 1996. The long-term sequelae of child and adolescent abuse: a longitudinal community study. *Child Abuse and Neglect* 20(8): 709−23.

Singh GK, Siahpush M. 2001. All-cause and cause-specific mortality of immigrants and native born in the United States. *American Journal of Public Health* 91(3): 392−9.

Singh GK, Siahpush M. 2002. Increasing rural-urban gradients in US suicide mortality, 1970−1997. *American Journal of Public Health* 92(7): 1161−7.

Skegg K. 1997. Suicide and parasuicide. Chapter 23 in *Mental Health in New Zealand from a Public Health Perspective*. Public Health Report No. 3. Wellington: Ministry of Health.

Skegg K, Cox B. 1993. Suicide in custody: occurrence in Māori and non Māori New Zealanders. *New Zealand Medical Journal* 106(948): 1−4.

Skegg K, Cox B, John B. 1995. Suicide among New Zealand Māori: is history repeating itself? *Acta Psychiatrica Scandinavica* 92: 453−9.

Slap GB, Vorters DF, Chaudhuri S, et al. 1989. Risk factors for attempted suicide during adolescence. *Pediatrics* 84(5): 762−72.

Smith DAR, Beautrais AL. 1999. Identifying young people at risk of suicide. *Social Work Now* 14: 23−34.

Smith K, Crawford S. 1986. Suicidal behavior among 'normal' high school students. *Suicide and Life-Threatening Behavior* 16(3): 313−25.

Spirito A, Overholser J. 1991. Cognitive characteristics of adolescent suicide attempters. *Journal of the American Academy of Child and Adolescent Psychiatry* 30(4): 604−8.

Stack S. 2001. Occupation and suicide. *Social Science Quarterly* 82(2): 384−96.

Stack S. 2000a. Suicide: a 15-year review of the sociological literature. Part I: cultural and economic factors. *Suicide and Life-Threatening Behavior* 30(2): 145−62.

Stack S. 2000b. Suicide: a 15-year review of the sociological literature. Part II: modernization and social integration perspectives. *Suicide and Life-Threatening Behavior* 30(2): 163−76.

Stanley M, Stanley B. 1989. Biochemical studies in suicide victims: current findings and future implications. *Suicide and Life-Threatening Behavior* 19(1): 30−42.

Statham DJ, Heath AC, Madden PAF, et al. 1998. Suicide behaviour: an epidemiological and genetic study. *Psychological Medicine* 28: 839−55.

Statistics New Zealand. 1998. *Demographic Trends.* Wellington: Statistics New Zealand.

Stein DJ, Hollander E, Liebowitz MR. 1993. Neurobiology of impulsivity and the impulse control disorders. *Journal of Neuropsychiatry and Clinical Neurosciences* 5(1): 9−17.

Swahn MH, Potter LB. 2001. Factors associated with the medical severity of suicide attempts in youths and young adults. *Suicide and Life Threatening Behavior* 32: 21−9.

Szanto K. 2003. Suicidal behavior in the elderly. *Psychiatric Times* XX(13), URL: http://www.psychiatrictimes.com/p031252.html.

Szanto K, Prigerson HG, Houck P, et al. 1997. Suicidal ideation in elderly bereaved: the role of complicated grief. *Suicide and Life Threatening Behavior* 27(2): 194−207.

Tiatia J, Coggan C. 2001. Young Pacifican suicide attempts: a review of emergency department medical records, Auckland, New Zealand. *Pacific Health Dialog* 8(1): 124−8.

Traskman-Bendz L, Mann JJ. 2000. Biological aspects of suicidal behaviour. In: K Hawton, K van Heeringen (eds). *The International Handbook of Suicide and Attempted Suicide* (pp. 65−77). New York: John Wiley and Sons Ltd.

Trout DL. 1980. The role of social isolation in suicide. *Suicide and Life-Threatening Behavior* 10(1): 10−23.

Tsuang MT, Simpson JC, Fleming JA. 1992. Epidemiology of suicide. *International Review of Psychiatry* 4(2): 117−29.

US Department of Health and Human Services. 2001. *National Strategy for Suicide Prevention: Goals and objectives for action*. Rockville, MD: National Library of Medicine Cataloging in Publication.

US Department of Health and Human Services. 2004. *Pragmatic Considerations of Culture in Preventing Suicide*. Philadelphia, PA: National Institute of Mental Health.

Verona E, Patrick CJ. 2000. Suicide risk in externalizing syndromes: temperamental and neurobiological underpinnings. In: TE Joiner, MD Rudd (eds). *Suicide Science: Expanding the boundaries* (pp. 137−730. Norwell, MA: Kluwer Academic Publishers.

Vijayakumar L, Rajkumar S. 1999. Are risk factors for suicide universal? A case-control study in India. *Acta Psychiatrica Scandinavica* 99: 407−11.

Waern M. 2003. Alcohol dependence and misuse in elderly suicides. *Alcohol and Alcoholism* 38(3): 249−54.

Waern M, Rubenowitz E, Wilhelmsson K. 2003. Predictors of suicide in the old elderly. *Gerontology* 49(5): 328−34.

Waern M, Runeson BS, Allebeck P, et al. 2002. Mental disorder in elderly suicides: a case-control study. *American Journal of Psychiatry* 159: 450−5.

Wang AG, Nielsen B, Bille-Brahe U, et al. 1985. Attempted suicide in Denmark. III: Assessment of repeated suicidal behaviour. *Acta Psychiatrica Scandinavica* 72: 389−94.

Warshaw MG, Dolan RT, Keller MB. 2000. Suicidal behavior in patients with current or past panic disorder: five years of prospective data from the Harvard/Brown Anxiety Research Program. *American Journal of Psychiatry* 157(11): 1876−8.

Wasserman D, Varnik A, Dankowicz M. 1998. Regional differences in the distribution of suicide in the former Soviet Union during perestroika, 1984−1990. *Acta Psychiatrica Scandinavica* 98(Suppl. 394): S5−12.

Weeke A. 1979. Causes of death in manic-depressives. In: M Schou, E Stromgren (eds). *Origin, Prevention and Treatment of Affective Disorders* (pp. 289−99). London: Academic Press.

Weir P, Ardagh M. 1998. The epidemiology of deliberate self poisoning presenting to Christchurch Hospital emergency department. *New Zealand Medical Journal* 111: 126−9.

Weishaar ME, Beck AT. 1990. Cognitive approaches to understanding and treating suicidal behavior. In: SJ Blumenthal, DJ Kupfer (eds). *Suicide Over the Life Cycle: Risk factors, assessment, and treatment of suicidal patients* (pp. 469−98). Washington, DC: American Psychiatric Press.

Weiss GK, Ratner A, Voltura A, et al. 1994. The effect of two different types of stress on locus coeruleus alpha-2 receptor binding. *Brain Research Bulletin* 33(2): 219−21.

Weissman MM, Klerman GL, Markowitz JS, et al. 1989. Suicidal ideation and suicide attempts in panic disorder and attacks. *New England Journal of Medicine* 321(18): 1209−14.

Wetzler S, Asnis GM, Hyman RB, et al. 1996. Characteristics of suicidality among adolescents. *Suicide and Life-Threatening Behavior* 26(1): 37−45.

Willerman L, Loehlin JC, Horn JM. 1992. An adoption and a cross-fostering study of the Minnesota Multiphasic Personality Inventory (MMPI) Psychopathic Deviate Scale. *Behavior Genetics* 22(5): 515–29.

Williams R, Morgan HG. 1994. *Suicide Prevention: The challenge confronted*. London: HMSO.

Wilson J, Everts JF. 1995. New Zealand's aging population: implications for counsellors working in a multicultural society. *New Zealand Journal of Counselling* 17: 51–8.

WHO (World Health Organization). 1999. *Figures and Facts About Suicide*. Geneva: Department of Mental Health, World Health Organisation.

World Health Organization. 2001. *The World Health Report 2001*. Mental Health: New Understanding, New Hope. France: World Health Organization

Yen S, Shea MT, Sanislow CA, et al. 2004. Borderline personality disorder criteria associated with prospectively observed suicidal behavior. *American Journal of Psychiatry* 161(7): 1296–98.

Yen S, Siegler IC. 2003. Self-blame, social introversion, and male suicides: prospective data from a longitudinal study. *Archives of Suicide Research* 7: 17–27.

Young SE, Stallings MC, Corley RP, et al. 2000. Genetic and environmental influences on behavioral disinhibition. *American Journal of Medical Genetics* 96(5): 684–95.

Zahl DL, Hawton K. 2004. Repetition of deliberate self-harm and subsequent suicide risk: long-term follow-up study of 11,583 patients. *British Journal of Psychiatry* 185: 70–5.

Zair K. 1981. A suicidal family. *British Journal of Psychiatry* 139: 68–9.