

Youth Suicide in Western Australia Involving Cannabis and Other Drugs

A literature review and research report

**Sharon D Hillman, Sven R Silburn, Andria Green & Stephen R Zubrick
TVW Telethon Institute for Child Health Research
WA Youth Suicide Advisory Committee**

December 2000

**Published by
Western Australian Drug Abuse Strategy Office**

Online copies of this report can be obtained from the
WA Strategy Against Drug Abuse Web Site

<http://www.wa.gov.au/drugwestaus/>

Table of contents

List of tables	iv
List of figures	v
Executive summary	vi
Introduction	vi
Objectives	vi
Methodology.....	vi
Summary of findings	vi
Recommendations	vii
Recommendations for universal prevention	vii
Recommendations for selective prevention.....	viii
Recommendations for indicated prevention	viii
Recommendations for monitoring and surveillance.....	viii
1. Introduction	1
1.1 Report parameters	2
2. Methodological issues	3
2.1 The current state of research.....	3
2.2 Types of studies	3
2.2.1 Psychological autopsy studies.....	3
2.2.2 Case control studies	3
2.2.3 Longitudinal studies	3
2.3 The spectrum of suicidal behaviour.....	4
2.3.1 Completed suicide	4
2.3.2 Attempted suicide	4
2.3.3 Suicidal ideation.....	4
2.4 Drug use issues relevant to the study of suicide	5
3. Literature on the association between drug use and suicidal behaviour	7
3.1 Use of alcohol and/or other drugs.....	7
3.1.1 Alcohol	7
3.1.2 Cannabis.....	8
3.1.3 Other illicit drugs	12
3.1.4 Multiple drug use.....	13
3.2 Co existing disorders	13
3.3 Summary.....	15
3.3.1 Is there an association between rising rates of suicide and alcohol and other drug use?	15
3.3.2 Does substance use make an independent contribution to the risk of suicide?	15
3.3.3 Is the association of substance use specific to particular substances?	16
3.3.4 What contribution does cannabis use make to suicide risk?.....	16
3.3.5 Do hazardous levels of alcohol consumption increase suicidality?.....	16

3.3.6	<i>How is suicidal behaviour best understood?</i>	16
4.	<i>Analysis of WA coronial and toxicology data</i>	19
4.1	<i>Method</i>	19
4.2	<i>Classification of suicide in Western Australia</i>	19
4.3	<i>Western Australian Coroner's database</i>	19
4.4	<i>Database linkages and confidentiality</i>	19
4.5	<i>Definitions</i>	20
4.6	<i>Data analysis</i>	21
4.7	<i>Study population</i>	21
4.8	<i>Alcohol and illicit drugs identified in the post mortem analysis</i>	24
4.8.1	<i>The presence of illicit drugs</i>	24
4.8.2	<i>Methods of suicide</i>	25
4.8.3	<i>Geographical differences</i>	26
4.8.4	<i>Unemployment</i>	27
4.8.5	<i>Previous drug use</i>	27
4.8.6	<i>Psychiatric history</i>	28
4.8.7	<i>Aboriginality</i>	29
4.8.8	<i>Deaths in custody</i>	29
4.8.9	<i>Previous suicide attempts</i>	29
4.8.10	<i>Precipitating circumstances</i>	29
4.9	<i>Alcohol</i>	31
4.10	<i>Polydrug involvement</i>	32
4.11	<i>Fatal use of alcohol or illicit drugs in deaths by suicide</i>	33
4.12	<i>Summary</i>	33
5.	<i>Review of current preventative programs</i>	35
5.1	<i>Evidence based prevention</i>	35
6.	<i>Options for reducing the incidence of suicide</i>	41
6.1	<i>Universal interventions</i>	41
6.2	<i>Selected interventions</i>	48
6.3	<i>Indicated interventions</i>	48
6.4	<i>The current status of prevention research</i>	49
7.	<i>Recommendations</i>	51
7.1	<i>Recommendations for universal prevention</i>	51
7.2	<i>Recommendations for selective prevention</i>	53
7.3	<i>Recommendations for indicated prevention</i>	53
7.4	<i>Recommendations for monitoring and surveillance</i>	54
8.	<i>References</i>	55
9.	<i>Appendices</i>	67
	<i>Appendix A</i>	69
	<i>Appendix B</i>	73
	<i>ICD9 E codes for classification of suicide</i>	73

<i>Appendix C</i>	75
<i>Health Zone Boundaries in Western Australia (1997)</i>	75
<i>Appendix D</i>	76
<i>List of references for risk and protective factors table (Table 11)</i>	76
<i>Appendix E: Preventative Programs – Expanded Synopsis</i>	77
<i>Universal Programs</i>	77
<i>Selective programs</i>	99
<i>Indicated programs</i>	120
<i>Appendix F: List of references and resources for preventative programs</i>	126

List of tables

<i>Table 1: Number and rates of suicide, young people Western Australia, 1986 to 1998.....</i>	<i>22</i>
<i>Table 2: Illicit drugs detected in post-mortem toxicology by gender and age group.....</i>	<i>24</i>
<i>Table 3: Illicit drugs detected in post-mortem toxicology, by gender and method of suicide.....</i>	<i>26</i>
<i>Table 4: Illicit drugs detected in post-mortem toxicology, by geographical location</i>	<i>27</i>
<i>Table 5: Illicit drugs detected in post-mortem toxicology, by employment status</i>	<i>27</i>
<i>Table 6: Illicit drugs detected in post-mortem toxicology, by substance use history.....</i>	<i>28</i>
<i>Table 7: Illicit drugs detected in post-mortem toxicology, by diagnosed psychiatric illness.....</i>	<i>29</i>
<i>Table 8: Illicit drugs detected in post-mortem toxicology, by previous suicide attempt.....</i>	<i>29</i>
<i>Table 9: Post-mortem blood alcohol levels, by gender and age (15-24yrs).....</i>	<i>32</i>
<i>Table 10: Illicit drugs in post-mortem toxicology, by blood alcohol level and gender</i>	<i>33</i>
<i>Table 11: Risk and protective factors for drug use and completed suicide in young people</i>	<i>39</i>
<i>Table 12: Preventative programs that address the risk and protective factors underlying drug use and suicide.....</i>	<i>42</i>
<i>Table 13: Findings of studies on completed suicide and the association with illicit drugs and alcohol.....</i>	<i>69</i>

List of figures

Figure 1:	<i>Suicide in Western Australia, 1986 to 1998, study population parameters</i>	23
Figure 2:	<i>Illicit drugs detected in post-mortem toxicology</i>	24
Figure 3:	<i>Illicit drugs detected in post-mortem toxicology, males, by year</i>	25
Figure 4:	<i>Drugs used prior to suicide</i>	28
Figure 5:	<i>Illicit drugs detected in post-mortem toxicology, by stressor, males 15-24 yrs</i>	30
Figure 6:	<i>Illicit drugs detected in post-mortem toxicology, by stressor, females 15-24 yrs</i>	31
Figure 7:	<i>The spectrum of interventions for mental health problems and mental disorders</i>	36

Executive summary

Introduction

Accumulating evidence of the association between harmful drug use and increased risks for a range of suicidal behaviours (fatal and non-fatal) has indicated the potential efficacy and benefits of coordinating initiatives to combat harmful drug use and suicide among young people. During the past decade changing patterns of drug availability and use have led to the need for an examination of the role played by illicit drugs such as cannabis, amphetamines, hallucinogens, MDMA (ecstasy) and opiates in accounting for the high level of suicidal behaviour among youth over this period. Community concern about increased rates of cannabis use and evidence recently presented at the Inaugural International Cannabis and Psychosis Conference (1999) has also suggested the need for a systematic investigation of the association between cannabis use and suicide.

Objectives

The WA Drug Abuse Strategy Office commissioned this report to:

- Outline the extent of the presence of alcohol and illicit drugs in all youth suicides (by persons 15 to 24 years of age inclusive) in Western Australia between 1986 and 1998.
- Review the literature regarding the contribution of cannabis and other drugs to youth suicide.
- Identify preventive programs in Australia and other comparable countries.
- Suggest options for reducing the incidence of suicide attributable to cannabis and other drugs among young people.

Methodology

Following a discussion of methodological issues relevant to the evaluation of research in the areas of drug abuse and suicide, the report reviews the national and international literature on the contribution of harmful drug use to youth suicide. The possible contributory effects of alcohol, cannabis and other illicit drugs to the deaths of 571 young Western Australians aged 15-24 years who completed suicide during the period 1986-1998 is then examined using clinical, toxicology and other forensic data from the WA State Coronial records. The literature on prevention strategies and programs targeting risk factors for harmful drug use and suicide in Australia and other comparable countries is then reviewed. Finally, options for reducing the incidence of suicide attributable to the harmful use of alcohol and illicit drugs in Western Australia are discussed along with recommendations for how this might be achieved.

Summary of findings

It is now generally accepted that the rise in suicide among younger age groups over the past few decades has been associated with secular changes in the use of alcohol and other drugs over the same period.

Almost half of male suicides and a third of female suicides had blood alcohol readings on post-mortem examination, which were above the WA legal limit for driving a motor vehicle (.05%).

Nearly a third of WA male suicides in the 15-24 years age group and over a quarter of females had illicit drugs detected on post-mortem examination.

The drugs most commonly associated with suicide in this age group were alcohol and cannabis, with cannabis detected in 20% of males and 11% of females. The next most commonly detected drugs were stimulants (9% of males & 8% of females) and opiates (7% of males & 12% of females). Young

people with a history of drug use were significantly more likely to have had illicit drugs detected at post-mortem.

Alcohol and other drug use appears to increase the risk of suicide both through the short-term effects of intoxication increasing the likelihood of impulsive suicide, and through the indirect effects of longer-term use and/or dependency resulting in accumulating psychosocial stress triggering, or by exacerbating existing mental health disorders. However, the evidence available suggests that the primary mechanisms of association are the disinhibiting effects of intoxication and its attenuation of cognition which both increase the risk of impulsive suicide.

The weight of evidence reviewed in this report suggests that reducing the population prevalence of suicidal behaviour and other youth risk behaviours associated with harmful levels of substance use will require a greater emphasis on universal and selective levels of prevention. The existing policy includes harm reduction however it needs to be complemented by universal strategies to reduce the early onset use of substances such as tobacco and alcohol by young adolescents. The potential health gains of such strategies derive both from their effects in lessening the likelihood of young adolescents progressing to lifelong patterns of harmful use of these substances and through their effects in limiting the extent to which tobacco and alcohol may operate as ‘gateways’ to the use of other substances.

Determining the optimum mix of indicated, selected and universal programs of prevention should be a key priority for policy, planning and resource allocation.

Recommendations

Recommendations for universal prevention

Recommendation 1

Broadly based universal strategies and programs of prevention to promote youth resilience are required to complement the existing policy framework of the Western Australian Strategy Against Drug Abuse which embraces demand reduction, supply reduction and harm reduction strategies but gives primary emphasis to the prevention and reduction of drug abuse.

Recommendation 2

The effective implementation of population level preventive interventions will require strengthening the links between clinical, prevention and promotion services across government and non-government agencies, the tertiary education sector and community organisations. Such links are required to ensure community and professional understanding and support as well as to develop the prevention infrastructure needed to support the on-going implementation and evaluation of population based prevention.

Recommendation 3

The effective implementation of evidence based, population level interventions will require investment in appropriate training and program delivery resources. This prevention infrastructure could be developed through re-positioning of existing treatment and prevention services but will also require the identification of new funding opportunities. Such opportunities could include jointly commissioned initiatives which address the shared risks for a range of adolescent outcomes of concern such as drug use, suicide, early school leaving and crime.

Recommendation 4

Health messages regarding the association between harmful levels of drug use and increased risks for suicide need to be made available to young people, their parents and the community at large.

Recommendation 5

A comprehensive range of strategies is required to delay the average age of onset in the use of tobacco and alcohol, which may operate as ‘gateway’ substances to cannabis and other illicit drugs. This should include curriculum and ‘whole school’ approaches to prevention and health promotion;

continuing universal exposure of young Western Australians to the K-12 Drug Education Package; and other practical measures to limit the access of young adolescents to tobacco and alcohol.

Recommendation 6

Public education and media campaigns are needed to continue to change community attitudes and norms regarding the ‘acceptance’ of underage drinking and adolescent ‘binge’ drinking.

Recommendation 7

Harm reduction strategies based on the encouragement of responsible drinking need to be backed by the encouragement of responsible hotel licensing and effective regulation of retail practices to reduce opportunities for hazardous levels of alcohol consumption.

Recommendations for selective prevention

Recommendation 8

Groups of young people at higher than average risk for suicidal behaviour and drug use who should be targeted for selective interventions include males, children of drug users, young people showing early signs of depression and other mental health problems and/or those with a history of conflict in the family.

Recommendation 9

Local communities with high rates of adolescent problem behaviours should be supported to mobilise and implement comprehensive evidence based prevention programs. While Local Drug Action Groups are effective in mobilising community action, suitable evidence based programs should also be implemented.

Recommendation 10

More research is needed to address male gender issues in the aetiology of drug use and suicide and to develop effective prevention and intervention strategies that address the needs of young males.

Recommendations for indicated prevention

Recommendation 11

Referral and admission criteria to mental health and substance use services need to ensure that young people with dual diagnosis who are at risk of suicide receive appropriate care and are not inadvertently excluded from treatment.

Recommendations for monitoring and surveillance

Recommendation 12

A better integration of existing administrative data systems and periodic population surveys is needed to enable the ongoing prevalence monitoring of youth alcohol and other drug use, mental health problems and suicidal behaviour in addition to some of the key causal risk factors.

1. Introduction

Opportunities for coordinating prevention initiatives in the drug abuse and suicide prevention areas are now being seriously examined by Commonwealth, State and Territory governments (Commonwealth Department of Health and Aged Care, 2000; Health Department of WA, 1999; Ministerial Council on Drug Strategy, 1998). This new focus on drugs and suicide reflects community concern and scientific evidence that the rise in alcohol and substance use among the young (and especially males) over the past three decades may have contributed to increases in the population rates of suicide.

Somewhat parallel increases in rates of substance use and suicide have been observed in more than a dozen developed countries including Australia (Diekstra, Kienhorts, & de Wilde, 1995; Shaffer, Gould, Fisher, & Trautman, 1996; Smith & Burvill, 1991). The accumulating evidence of the association between harmful drug use and increased risks for a range of suicidal behaviour (fatal and non-fatal) has indicated the potential efficacy and benefits of jointly commissioned and targeted prevention strategies to reduce suicide and other forms of self-harm caused through drug use.

The mechanisms of the association between drug use and suicide are poorly understood. What is known is that risk factors for suicide and harmful drug use are often related and risk settings for their emergence frequently overlap. This could reflect similar underlying aetiological processes and/or the associated development of other conditions (such as depressive disorders). Alternatively, the use of other or drugs might play a critical role at the time of the suicidal act through their actions in reducing inhibition and increasing impulsivity. It has also been speculated that increased use and availability of opiates may account for a growing proportion of accidental and deliberate overdoses due to the more ready availability of highly lethal means of ending one's life (Lynskey & Hall, 1998).

Earlier Western Australian studies of the association between harmful drug use and suicide focused particularly on alcohol use and suicide (Graham & Burvill, 1992), and the increased proportion of suicides having elevated blood alcohol levels (BAL) at the time of death, and/or a history of alcohol or other drugs usage (Hayward, 1989; Hayward, Zubrick, & Silburn, 1992). In a series of cross national community samples studied retrospectively, substance use (including alcoholism) was found in 25 - 55% of suicides, a rate far in excess of its prevalence in the adult population. Alcohol remains the most widely used drug among adolescents and young adults in Australia today. Data from the National Drug Survey indicates that in 1995 around 18% of 15-19 year olds Australian males and females and 22% of males and females aged 20 and over engaged in levels of drinking that were classified as harmful/hazardous, binge drinking or heavy drinking (Makkai & McAllister, 1998). It has thus been speculated that such levels of drinking may be associated with increased risk of suicide by young people in Western Australia (Hillman, Silburn, Zubrick, & Nguyen, 2000).

During the past decade changing patterns of drug availability and use have led to the need for a more thorough examination of the role played by illicit drugs such as cannabis, amphetamines, hallucinogens, MDMA (ecstasy) and opiates (Select Committee into the Misuse of Drugs Act 1981, 1998). All of these psychoactive drugs can act as powerful disinhibitors and may precipitate marked changes in affect, coping abilities and impulsivity thus increasing risks for suicidality. Practitioners working in Western Australian mental health, emergency services and drug and alcohol treatment settings report that they are more frequently being required to deal with individuals presenting with co-existing mental health and drug problems where suicidality is a critical issue for treatment and ongoing case management (HDWA Mental Health Division, 1999).

Recent trends in illicit drug use reported by the Australian Institute of Health and Welfare show cannabis use in the a 12 month period by Australians aged 14 years and older increased from 13% to 18% between 1995 and 1998 and amphetamine use doubled over the same period (Higgins, Cooper-Stanbury, & Williams, 2000). There have also been new concerns expressed about cannabis due to the fact that its major psychoactive component tetrahydrocannabinol (THC) is now present at levels several times greater than those found in the cannabis used in Australia in the late 1960s and early 1970s (Author Unknown, nd). Since THC is a fat-soluble compound that is stored in body tissue and released into the blood stream over a period of days or weeks, its accumulation may reach toxic levels

with regular, heavy use. While both of these new concerns could potentially be associated with increased suicidality among young people, the extent to which this has actually occurred among young Western Australians is currently unknown.

1.1 Report parameters

This report seeks to assess the impact of changing patterns of drug use on youth suicide in Western Australia. This has been done by:

- conducting an analysis of the available local Coronial and toxicology data;
- reviewing the national and international literature on the contribution of harmful drug use to youth suicide;
- reviewing prevention strategies and programs targeting harmful drug use and suicide that have been implemented and evaluated in Australia and other comparable countries; and
- discussing options for reducing the incidence of suicide attributable to the harmful use of alcohol and illicit drugs in Western Australia along with recommendations for how this might be achieved.

Key epidemiological questions that need to be addressed for developing and evaluating preventive strategies include:

1. What are the key risk factors for suicide associated with drug use?
2. How do these risk factors interact with one another and how is their effect modified by the presence of other factors?
3. Are there key mechanisms or potentially modifiable causal pathways which can be identified and systematically targeted for prevention?
4. How prevalent are these risks and outcomes in the (Western Australian) population of concern?

This report endeavours to address these questions and provide an overview of the contribution of alcohol and illicit drugs to the suicide of young people in WA. It includes an examination of the role of harmful alcohol use, cannabis and other illicit drugs, but does not include an assessment of the possible contribution of pharmaceutical drugs to suicide. While it is recognised that prescribed and over-the-counter medications are commonly misused (particularly by poly-drug users), and that they are the main means of deliberate overdose, their association with suicide is not within the project remit¹.

¹ For a review of the contribution of prescribed and over the counter drugs to suicide and deliberate self-harm in WA refer to the reports by Hillman, S. D., Silburn, S. R., Zubrick, S. R., & Nguyen, H. (2000). *Suicide in Western Australia 1986 to 1997*. Youth Suicide Advisory Committee, TVW Telethon Institute for Child Health Research, and Centre for Child Health Research, Faculty of Medicine and Dentistry, The University of Western Australia and Serafino, S., Somerford, P., & Codde, J. (2000). *Hospitalisation as a consequence of deliberate self-harm in Western Australia, 1981-1998*. Health Department of Western Australia.

2. Methodological issues

Several areas of concern exist surrounding the current state of research in the area of suicide and other drug use. A brief consideration of these issues is warranted at this point to contextualise the literature review and the findings of the analysis of the Western Australian Coronial and toxicology data.

2.1 The current state of research

Despite the general weight of evidence from clinical and population studies showing that harmful levels of alcohol and other drug use is over-represented among those who suicide, there remains considerable uncertainty about several aspects of this association (Diekstra, Kienhorts, & de Wilde, 1995; Hawton, Fagg, Platt, & Hawkins, 1993; Neeleman & Farrell, 1997; Shaffer, Gould, Fisher, & Trautman, 1996). Much of this uncertainty arises from the fact that both suicide and drug use are personally sensitive issues which pose special problems in the collection of reliable and valid data on their prevalence and associated risks. Harmful drug use is not always readily admitted, either because of its illicit nature or because of its perceived social undesirability.

Studies of risk factors for suicide among users of specific drugs are also complicated by the fact that both substance use and suicidal behaviour vary widely. Studies also vary in which aspects of suicide or drug use they focus upon and this also gives rise to problems in generalising findings from one study to another. For example, results from a study on cannabis use and suicidal ideation are difficult to compare with a study of intravenous drug use and completed suicide (Neeleman & Farrell, 1997). Studies do not always distinguish between use and dependence, nor is there always a clear distinction drawn between alcohol and other drug use. Depending on the research questions, the methodologies, the definitions used, and the populations studied, results vary considerably (Mino, Bousquet, & Broers, 1999).

2.2 Types of studies

Overcoming these methodological challenges has required the use of various study designs, which have particular strengths and limitations that need to be taken into account. The research designs of the studies considered in this review may be categorised into three broad groups:

2.2.1 Psychological autopsy studies

Data on suicide is mostly recorded retrospectively or obtained from people other than the deceased person by means of psychological autopsy. The limitation of almost all of the studies using this method of investigation is that they do not include a comparison group of people who have not died by suicide. This makes it difficult to assess whether the risk factors uncovered actually make a causal contribution to the suicide (Borges, Anthony, & Garrison, 1995).

2.2.2 Case control studies

This research design seeks to overcome the limitation of psychological autopsy studies by contrasting a representative group exhibiting suicidal behaviour with a sample of those not showing the behaviour on particular risk factors of interest. The main limitation of studies using this study design is that the information about the exposure to risk factors is obtained retrospectively, thus raising questions of recall bias (Commonwealth Department of Health and Aged Care, 1999).

2.2.3 Longitudinal studies

Prospective studies offer the best evidence regarding the causal direction and possible mechanisms of the associations of interest. However, the limitation of such studies in studying suicide and suicidal behaviour is that the low prevalence of suicide requires very large sample sizes and study periods of observation that extend over many years. The resource and cost demands of the longitudinal design have limited its use in the investigation of suicidal behaviour and drug use to only a very small number of such studies.

2.3 The spectrum of suicidal behaviour

Studies of risk factors for suicide encompass behaviours that may be either fatal or non-fatal. These behaviours range from completed suicide, through attempted suicide, other forms of deliberate self-harm, and ideas and thoughts about suicide, which are not acted upon. The spectrum of non-fatal suicidal behaviour among Australian adolescents aged 13 - 17 years has been described in the child and adolescent component of the 1998 National Survey of Mental Health and Well-Being (Sawyer, 2000). This study found that during the previous year 12% of adolescents had seriously considered attempting suicide, 9% had made a plan to attempt suicide, 4.2% had actually attempted suicide, and 0.9% had made a suicide attempt resulting in an injury requiring treatment by a doctor or nurse (Sawyer, 2000)². While the major focus of this review is on completed suicide, it is also necessary to examine the literature on the relationship between harmful drug use and other suicidal behaviours. Some of the methodological issues relevant to the study of each of these forms of suicidal behaviour are as follows:

2.3.1 Completed suicide

There are significant differences within and between countries in how suicide is determined and officially recorded. These differences limit the extent to which one can generalise findings from studies of suicide conducted in different countries. The identification of risk factors for completed suicide is almost exclusively derived retrospectively from Coronial records or psychological autopsy studies. The major limitations of such studies are incomplete information and recall bias (Commonwealth Department of Health and Aged Care, 1999). More recently, some prospective longitudinal data on risk factors for suicide have become available from population level databases and long term cohort studies in the UK, Scandinavia and New Zealand.

2.3.2 Attempted suicide

Prevalence estimates of attempted suicide among youth vary because of the different age groups surveyed and differing definitions of what constitutes a suicide attempt. Suicide attempts by young people can range from acts in which the individual clearly intends to end his/her life to various forms of self-inflicted poisoning or injury where suicidal intent is minimal or not immediately apparent. Within Australia, hospital admission and discharge data on non-fatal suicide attempts is not uniformly recorded and comparative data are not readily available for all States and Territories.

The majority of suicide attempts are thought to go undetected and estimates of the proportion of attempts resulting in hospital admission range from 5 – 30% (Serafino, Somerford, & Codde, 2000). Most of suicide attempts resulting in hospital admission involve no more than minor physical harm and are not generally undertaken with serious intent to die (Hazell, 2000; Silburn, Zubrick, Hayward, & Reidpath, 1991). However, follow-up studies have shown that within this group there is a subgroup of cases with persistent suicidal ideation and serious suicide attempts who are at high risk for further suicide attempts and suicide, particularly where there is a co-existing depressive disorder and a history of substance abuse (Hawton, Houston, & Shepperd, 1999; Serafino et al., 2000; Silburn, Zubrick, & Acres, 1997).

2.3.3 Suicidal ideation

The assessment of suicidal ideation is complicated by the fact that its ascertainment is largely reliant on the use of self-report measures and the fact that its reporting by individuals is conditioned by the context in which the information is sought. This could range from anonymous population surveys to direct questioning in a clinical interview (Goldney, Wilson, Dal Grande, Fisher, & McFarlane, 2000). The prevalences reported for suicidal ideation among young people vary considerably because of the

² These prevalences are somewhat lower than the figures from the 1999 Youth Risk Behaviour Surveillance survey of over 15,000 US high school students. This study found around 19% of the nationwide sample had seriously contemplated ending their own lives, around 14% had made a plan for how they might do this, and 8.3% had attempted suicide one or more times during the 12 months preceding the survey Centers for Disease Control and Prevention (CDC) (2000). *CDC surveillance summaries: Youth risk behaviour surveillance, United States, 1999* (SS-5). US Department of Health and Human Services..

different ages surveyed, the specific populations studied and the variety of ways in which suicidal ideation is measured. A recent comprehensive review of community surveys concluded that up to 25% of young people aged 15-24 years may have suicidal ideation at any one time (Commonwealth Department of Health and Aged Care, 1999).

2.4 Drug use issues relevant to the study of suicide

There are several issues concerning the nature of drug use, which have contributed to the uncertainty about its association with suicide and suicidal behaviour. These include the particular type of substances used, the pattern and frequency of drug use, whether or not drug dependency problems are an issue, and whether the drug(s) used contributed directly or indirectly to the suicidal behaviour in question.

Data from the 1998 National Drug Strategy Household Survey (NDSHS) shows that alcohol (at hazardous or harmful levels*) and cannabis were the most commonly used drugs in a 12 month period (1998) for young people aged 14-29 years in Western Australia.

	Males	Females
Alcohol*	48.15%	44.25%
Cannabis	49.65%	33.65%
Heroin	4.25%	2.3%
Amphetamines	21.3%	6.0%
Hallucinogens	13.75%	8.3%
Ecstasy	16.8%	5.6%
Cocaine	2.0%	1.15%
Any illicit drug	50.1%	33.1%

* Hazardous or harmful levels of alcohol are defined as 5 or more standard drinks consumed on one occasion Australian Institute of Health and Welfare (2000). *1998 National drug strategy household survey*. Australian Institute of Health and Welfare.

With the exception of alcohol,³ relatively little is known about the types of substances most strongly related to fatal and non-fatal suicidal behaviour. For example it is only very recently that the differing effects of depressants as opposed to stimulants and hallucinogens in predicting suicide and suicidal behaviour has been examined (Borges, Walters, & Kessler, 2000; Neeleman & Farrell, 1997).

Alcohol and other drugs are frequently both used and it is difficult to disentangle their independent contribution to suicide. There is variation in the extent to which levels of alcohol and other drug use may be considered harmful and how such levels are best defined (Makkai & McAllister, 1998). Many of the studies reporting an association between the use of drugs and suicide do not adequately differentiate whether or not this was associated with addiction or dependency problems. Furthermore, drug use can be infrequent, episodic or regular.

Finally, there is also the issue of whether an individual's current drug use has contributed directly or indirectly to the fatal suicidal act. For example, alcohol use may contribute directly to impulsive suicides through acute intoxication increasing impulsivity, cognitive impairment and the incapacity to

³ Retrospective case record and "psychological autopsy" studies in the USA, Europe and Australia have shown remarkable uniformity in finding alcohol and/or substance abuse to be second only to depressive disorders as the most common antecedent to suicide accounting for between one fifth to one half of cases Murphy, G. E. (2000). *Psychiatric aspects of suicidal behaviour: Substance abuse*. In van Heeringen, K & Hawton, K. (Ed.), *The international handbook of suicide and attempted suicide* (pp. 135-146). England: John Wiley & Sons, Ltd..

deal with an immediate stress. It may also contribute indirectly to suicide through the effects of heavy alcohol and/or other drug consumption over a longer term causing psychosocial disorganisation and mental health disorders such as depression, in which the likelihood of suicidal ideas and behaviour increases (Borges et al., 2000).

3. Literature on the association between drug use and suicidal behaviour

3.1 Use of alcohol and/or other drugs

The increased use of alcohol and other licit and illicit drugs among adolescents and young adults over the past few decades has been widely cited as one of the main factors contributing to observed increases in the rate of suicide (Crumley, 1990; Fowler, Rich, & Young, 1986; Levy & Deykin, 1988; Maris, 1981). Substance use is also quite common in young suicide attempters, especially males (Hawton, 1994). When compared to the general adolescent population or suicidal in-patient controls, young suicide completers are more likely to have a history of misusing alcohol and/or other drugs (Brent, Perper, Goldstein, & Kolko, 1988; Shaffer et al, 1996).

Studies of adolescent and young adult suicide in the United States consistently report high rates of alcohol and other drug use (60 - 70%) (Brent et al, 1988; Marttunen, Aro, Henriksson, & Loennqvist, 1991; Rich, Young, & Fowler, 1986; Shaffer et al, 1996; Shafii, Carrigan, Whittinghill, & Derrick, 1985). On the other hand, European studies have generally reported somewhat lower levels of associated alcohol and/or drug use (30% - 47%) (Appleby, Cooper, Amos, & Faragher, 1999; Marttunen et al, 1991; Runeson, 1989). Cohort studies of suicide attempters also indicate that the presence of substance use, specifically alcohol use, strongly increases the likelihood of eventual death through suicide (Hawton, Fagg, Platt, & Hawkins, 1993; Lester, 1999).

While some authors have questioned the extent to which drug use is over-represented in people who complete suicide (Appleby, 2000; Isometsae et al, 1997), the weight of evidence from general population studies suggests that substance use is associated with an increased risk of suicide, especially in young people (Diekstra, Kienhorts, & de Wilde, 1995; Hawton et al, 1993; Neeleman & Farrell, 1997; Shaffer et al, 1996). A case control study in Quebec showed that alcohol dependence and psychoactive substance dependence were significantly more prevalent among those men who had completed suicide than amongst those in the comparison group (Lesage, Boyer, Grunberg & Vanier, 1994). In a large scale longitudinal study of military recruits in Sweden significantly higher rates of suicide and other causes of mortality were found among drug addicts than among the general population (Allebeck & Allgulander, 1990b). In the UK, a prospective study of addicts aged 15-24 found them to be six times more likely to die of suicide than persons of the same age in the general population (Oyefeso, Ghodse, Clancy, Corkery, & Goldfinch, 1999).

Population level Australian data, derived from hospital and health service records has recently been used to derive the aetiological fraction which alcohol and other drugs contribute to various morbidities and mortalities (English et al, 1995). This study concluded that the only drugs to have a significant independent association with suicide were alcohol and opiates. Unwin and Codde (1998) have also recently used Health Department of Western Australia morbidity and mortality data to estimate the aetiological fraction of suicide attributable to alcohol consumption in Western Australia. They calculated that in males aged 15-24, approximately 13% of suicides could theoretically be attributable to harmful levels of alcohol use, and in females aged 15-24, around 9% of suicides were attributable to alcohol use. Chronic alcohol problems or dependent use of opiates would appear to increase the risk of suicide both directly and through their indirect effects such as social deprivation, isolation and poor physical health status. Moreover, acute intoxication or the acute effects of opiates may further increase risk through a direct depressive effect, impairment of judgement and by increasing the biological susceptibility of a suicidal act having a fatal outcome.

3.1.1 Alcohol

Brent et al's study of youth suicide in the USA, found an increase in the suicide rate for white youths (15-19 years old) from 6.47 per 100,000 in 1960 to 14.37 per 100,000 in 1983 (Brent, Perper, & Allman, 1987). This increase was paralleled by an increase in the number of positive blood alcohol readings from 12.9% to 46% in 1983. They also found an association between blood alcohol and the choice of more impulsive and lethal methods of suicide such as firearms. A study of US college

students found a strong association between intoxication and substance use in a sample who attempted suicide and those who completed suicide (Ravinus, 1990). This study found that 56% of those who had completed suicide were intoxicated with alcohol or other drugs at the time of their suicide.

Williams and Morgan's (1994) study of adolescent suicide in London found around one-third were intoxicated at the time of death. Another UK investigation of a series of consecutive suicides in under 25-year-olds, concluded that alcohol had clearly made a contribution to the suicidal acts of a sizeable proportion of the individuals studied (Hawton et al, 1999). Excessive blood alcohol levels were found in over one fifth of cases after post-mortem analysis. Another notable result of this study was that very few individuals had post-mortem evidence of having used other (illicit) drugs shortly before their death. These findings suggested that alcohol may contribute to increasing the probability of impulsive, spur-of-the-moment suicides (Hawton et al, 1999).

A recent Western Australian Coronial record study showed that 43% of all male suicides had alcohol detected in their blood at the time of death (Hillman et al, 2000). In an earlier Western Australian study, Hayward et al (1992) found 36% of suicides by persons of all ages had positive blood alcohol readings and that those who had been drinking alcohol prior to suicide were younger, more likely to be male, more likely to have chosen carbon monoxide as the method of suicide, more likely to have a history of psychiatric disorder, more likely to have experienced a break up in a relationship and less likely to have sought professional help than those who had not been drinking. While this study did not provide evidence for a causal relationship between alcohol consumption and suicide it did suggest that it plays an important contributory role in a sizeable subset of cases (Hayward et al, 1992).

The association between alcohol and other drug dependency and suicide is substantiated by a large number of population and clinical studies (Norstroem, 1995). Case-control studies have generally shown that all forms of suicidal behaviour are higher among alcoholics and drug addicts than in the total population (Allebeck & Allgulander, 1990b; Beck & Steer, 1989; Black, Yates, Petty, & Noyes, 1986; Driessen, et al, 1998; Frances, Franklin, & Flavin, 1987; Madianos, Gefou-Madianou, & Stefanis, 1994; Motto, 1980; Murphy, 1988; Schuckit, 1986). Studies of individuals who completed suicide consistently report a high incidence of alcoholism. Several follow-up studies of alcoholics report grossly elevated risk ratios for suicide (Berglund, Krantz, & Lundqvist, 1987).

Borges et al, (2000) have recently reported findings from the US National Co-morbidity Study, a large scale population survey investigating the mechanisms of association between substance use disorders and suicidal ideation. Data from this cross-sectional survey of the onset of suicidal behaviour and lifetime use of substances were used in a sophisticated time-lagged survival analysis. They found that after controlling for socio-demographic factors and lifetime co-morbid mental health disorders, there was a monotonic increase in the risk of suicide attempt associated with increasing levels of alcohol use. A two fold increased risk for suicide attempt was found among the 48% of individuals who used alcohol without abuse or dependence (OR = 2.2, 95% CI = 1.4 – 3.5). This risk increased further for the 9.2% of individuals who had levels of alcohol consumption consistent with alcohol abuse (OR = 3.3; 95% CI = 1.6 – 6.9) and the 25% of individuals who reported alcohol dependence (OR = 5.9; 95% CI = 3.4 – 10.2). They were also able to demonstrate that the effects of alcohol use on suicidal behaviour were largely on increasing suicidal ideation and unplanned attempts among ideators (Borges et al, 2000). Current alcohol use, even in the absence of abuse or dependence, must thus be considered a significant risk factor for impulsive, spur-of-the-moment suicide attempts.

3.1.2 Cannabis

There are surprisingly few studies that specifically examine the possible contribution of cannabis use to suicide. While it is generally believed that occasional cannabis use presents few risks to the mental health of the majority of adult users, there is increasing recognition that regular cannabis use has adverse effects for a proportion of vulnerable individuals (Fergusson, Woodward, & Horwood, 2000; New Zealand House of Representatives, 1998).

At the individual level, the potential risks for suicide associated with acute cannabis use may derive from the psychomotor and cognitive impairment associated with cannabis intoxication. While these risks are similar to those that arise from alcohol intoxication, it remains to be determined whether acute cannabis intoxication produces similar increases in various kinds of accidental injury and death, including suicide (Hall, Solowij, & Dafour, 1994). The immediate adverse effects of cannabis ingestion can occasionally include symptoms such as feelings of anxiety, panic or depression, but there are no studies that report such short-term effects related to suicidal behaviour.

Long-term cannabis use can lead to cannabis dependency in some individuals, which may increase indirect risks for suicide through the increased likelihood of legal, interpersonal and other psychosocial difficulties associated with dependency. Chronic, heavy (daily) use can produce acute toxic psychosis due to the long half-life of delta 9 tetrahydrocannabinol (THC) resulting in accumulating levels of this psychoactive component of cannabis (Hall et al, 1994). Such toxic psychoses remit rapidly following abstinence but the disruption to normal brain processes during such an episode may increase risks for injury, accidental death and/or suicide. The likelihood of the increased prevalence of such toxic psychoses has been suggested from evidence regarding the increased availability of more potent strains of cannabis (Hall et al, 1994).

There is also strongly suggestive evidence that regular cannabis use can trigger other forms of psychoses latent in vulnerable individuals (Allebeck, 1991). However, there is less support for the hypothesis that cannabis use can cause either an acute or a chronic functional psychosis which persists beyond the period of intoxication. Such a possibility is difficult to study because of the rarity of such psychoses, and the difficulties of distinguishing them from schizophrenia and affective psychoses occurring in individuals who also use cannabis (Hall et al, 1994). It has also been suggested that acute psychosis associated with heavy cannabis use, particularly among Indigenous populations, can increase risks for suicide (Hunter, 1995). This type of acute psychosis closely resembles other toxic psychoses in which confusion, amnesia, delusion, hallucination, anxiety, agitation and hypomanic symptoms predominate (Negrete, 1984; Nelson, 1993).

This review was able to find only one published report that specifically relates cannabis use to suicide mortality. This was Andreasson and Allebeck's (1990) prospective study of Swedish conscripts which found the relative risk for suicide by heavy cannabis users was four times that of non-users, while lesser/casual use was not associated with an increased risk. However, a causal relation between cannabis use and suicide seemed unlikely, given the co-morbidity of both of these with other substance use and mental disorder (Harris & Barraclough, 1997).

The Western Australian Child Health Survey found suicidal ideation among adolescents (aged 12 – 16 years) to be almost three times more common among those who reported having ever used cannabis than those who had not (33% vs 13%). The same study found that adolescents who reported suicide attempts or deliberate self-harm in the past six months were more likely to have used cannabis (41% vs 17%) (Zubrick et al, 1995). However, the number of adolescents in this study (N=788) was insufficient to control for other confounding factors.

The Victorian Adolescent Cohort of 2,066 secondary school students aged 15-16 years provides important evidence on the association between different risk factors (including cannabis use) for suicidal behaviour in this age group (Patton et al, 1997). This study has employed well-defined self-report measures of deliberate self-harm and suicidal ideation as well as measures of psychiatric morbidity and frequency of alcohol and cannabis consumption in the past six months. Using logistic regression models in which potential demographic confounders (age, gender, and parental marital status) were taken into account, psychiatric morbidity was shown to have the strongest association with self-harm for both males and females. Weekly cannabis use was also found to be independently associated with a five-fold increase in self-harm among females but no such association with cannabis use was found among males (Patton et al, 1997).

A recent New Zealand case-control study compared 302 consecutive hospital admissions of medically serious suicide attempts with 1,028 randomly selected control participants (Beautrais, Joyce, &

Mulder, 1999). This study found that 16.2% of suicide attempters met DSM-III-R criteria for cannabis abuse/dependence at the time of the attempt in contrast with 1.9% of the control subjects (O.R.= 10.3; 95% C.I.= 5.95 - 17.8). However, when the association between cannabis use/dependence and suicide attempt was controlled for socio-demographic factors, childhood factors and concurrent psychiatric morbidity, the association fell short of significance (O.R.=2.0, 95% C.I.= 0.97 - 5.3, $p<0.06$). They concluded that most of the association between cannabis abuse/dependence could be accounted for by two reasons. Firstly, individuals who develop cannabis abuse/dependency tend to come from disadvantaged socio-demographic and childhood backgrounds which, independently of cannabis abuse, are associated with higher risk of suicide attempt, and/or Secondly, because cannabis abuse/dependence is co-morbid with their mental disorders (specifically mood disorders, other substance use disorders, and antisocial disorders) which are independently associated with suicidal behaviour.

While Beautrais et al's (1999) New Zealand data did not exclude the possibility that cannabis abuse/dependence may also make an independent contribution to the risk of serious suicide attempt, both directly and through the possible effects of cannabis abuse/dependence on the risk of other mental disorders, recent evidence from the US National Comorbidity Study has shown that when socio-demographic factors and mental health disorders are taken into account, there remains a significant residual risk for suicide attempt associated with any level of regular cannabis use. This study demonstrated a two fold increased risk for first suicide attempt among the 38% of individuals surveyed who used cannabis without abuse or dependence (OR = 2.0; 95% CI = 1.5 - 2.6). This risk increased further for the 8.1% of individuals who abused cannabis without dependence (OR = 2.6; 95% CI = 1.7 - 4.8) and the 7.8% of individuals who reported cannabis dependence (OR = 2.7; 95% CI = 1.3 - 5.5) (Borges et al, 2000).

Associations showing odds ratios of less than three are generally considered to be 'weak' however they may be of practical and social importance where the risks are prevalent. As Doll has pointed out, 'weak' association may be even more important for public health, if the risk factors are very prevalent, than 'strong' associations for risks that only occur rarely (Doll, 1997). However, this inference can only be drawn from large-scale, well-conducted, epidemiological studies which have addressed the issues of confounding and bias, and from studies where the causal direction of associations can be demonstrated. These conditions are met in the US National Comorbidity Study and the reported prevalences of varying levels of cannabis use and their associated odds ratios for suicide attempt would therefore suggest that as much as 45% of first suicide attempts in the population surveyed could theoretically be attributable to cannabis use⁴ (Borges et al,2000).

Cannabis use is largely a behaviour of late adolescence and early adulthood and its use among young Australians is now endemic. At the population level, increases in adolescent cannabis use has raised concerns about cannabis serving as a 'gateway' to the use of other drugs and behaviours associated with increased suicide risk such as conduct disorder (Smith & Rutter, 1995). This has been a focus of much research and debate since the 1970s and is an important consideration in evaluating the likely benefit of universally based strategies of prevention which aim to delay or prevent adolescents from taking up tobacco, alcohol or cannabis use on the assumption that this will reduce the likelihood of their progressing to the use of other (potentially more harmful) substances.

The 'gateway' theory of progression from licit to illicit substance use has a long and controversial history (Kandel & Faust, 1975; MacCoun, 1998). Proponents of this theory have suggested that

⁴ This estimate was based on the attributable risk calculated using the formula $AR = P (OR-1) / P (OR-1)+1$ where P = prevalence of the population having the characteristic and OR = odds ratio of the risk associated with the characteristic. The derived attributable risks were as follows:

Level of cannabis use	Prevalence (P)	OR for suicide attempt	Attributable Risk
Use without abuse or dependence	34.7	2.0	27%
Abuse without dependence	8.1	2.6	5.3%
Dependence	7.8	2.7	11.7%

cannabis somehow functions as a 'gateway' between legitimate substances such as tobacco and alcohol and illicit substances. Detractors of the theory argue that progression to illicit substance use is accounted for by the presence of other confounding factors and processes that encourage both cannabis and other illicit substance use. It has for example been proposed substance use is a symptom of a larger set of destructive risk behaviours and that cannabis use has no independent effect of other illicit drugs (Donovan & Jessor, 1985; Farrell, Danish, & Howard, 1992; Jessor, Chase, & Donovan, 1980). These authors contend that drug use is determined by a single underlying dimension of vulnerability to drug use, which is associated with other risk-taking or norm-violating behaviours.

Another theory suggests that progression to other illicit substance use may simply reflect the fact that young people predisposed to using illicit substances commonly have easier access to cannabis and hence are more likely to use it before other substances (MacCoun, 1998).

The polarisation of views in the prevention field regarding the role of cannabis as a 'gateway' substance has been exacerbated by the fact that, until quite recently, the information supporting this view has only been available from cross-sectional and retrospective studies (Kandel & Yamaguchi, 1993). For example, cross-sectional data on drug use among Australian adults in a 1993 survey showed that even though 96% of cannabis users have never used heroin, those who had tried cannabis were around 30 times more likely to have used heroin, and the greater the frequency of cannabis use, the higher the frequency of heroin use (Donnelly & Hall, 1994).

A recent large scale study designed specifically to investigate the evidence for the 'gateway' theory used cross sectional and retrospective self-report data on current and previous drug use from a nationally representative sample of US high school students (n=10,909) (Merrill, Kleber, Shwartz, Liu, & Lewis, 1999). Their multivariate (logistic regression) analysis concluded that after accounting for behaviours such as conduct disorder and delinquency, students in their final year of high school who had used tobacco before age 13 were 3.3 times more likely (95% C.I.=2.3 - 4.6) to have used cannabis than students who had never smoked; for alcohol, the odds ratio was 4.5 (95% C.I.=2.6 - 7.7). Final year students having using cannabis before age 14 were 7.4 times (95% C.I.= 4.0 - 13.6) more likely to have also used other illicit drugs. While the findings from such studies are suggestive of the validity of the 'gateway' theory, they also tend to overstate the risks for progression and do not establish the causal nature of the associations involved (Barone et al, 1995; Donovan, Jessor, & Costa, 1985).

It is clear that the investigation of the causal processes and relevant risks for progression can only be explored longitudinally, that is with progressive measurement at multiple time points of drug use and putative risk factors (Coffee, Lybskey, Wolfe, & Patton, 2000; Kandel & Yamaguchi, 1993). However, this requires the availability of large samples capable of supporting analytic methods which can explore competing hypotheses and the interaction of risk processes (Fergusson & Horwood, 2000). Several longitudinal studies beginning early in childhood have identified childhood and early adolescent risk factors for cannabis use, but infrequent observations during the adolescent and years have limited the ability of these studies to clarify the risk processes during the mid to late teens when there cannabis use rapidly increases.

Coffee et al (2000) using data from the Victorian Adolescent Cohort Study (n=2,032) have recently examined predictors of cannabis use initiation, continuity and progression to daily use in the final years of secondary school. They employed well defined measures of the level of use of alcohol, tobacco and cannabis and a multivariate design to adjust for confounding factors such as anti-social behaviour, and peer drug use and found evidence for 'gateway' effects for early tobacco, alcohol and cannabis use. The findings of this study have important implications for prevention in the Australian context. These findings showed that most cannabis use remained occasional during adolescence but around 12% of early users progressed to daily (and potentially harmful) use.

Peer cannabis use, daily smoking of tobacco, alcohol use, and high rates of school-level cannabis use were all associated with mid-school cannabis use and independently predicted late school uptake. Cannabis use persisted to late-school use in 80% of mid-school users. Persisting cannabis use from

mid- to late-school was more likely in regular users (OR=3.4), cigarette users (OR any smoking: 2.0, daily smoking: 3.3). Mid-school peer use independently predicted uptake of cannabis use by males in late school (OR=6.5), while high dose alcohol use (OR=6.1) and antisocial behaviour (OR=6.6) predicted late school uptake by females. While these findings do not prove a causal association they nevertheless suggest the validity of a 'gateway' model in accounting for the progression observed in males whereas among females there is also support for the effect of the association with multiple problem behaviours.

The most comprehensive longitudinal investigation yet made of whether cannabis use may encourage other forms of illicit drug use has used data gathered during the course of the 21 year Christchurch Health and Development Study of 1265 children (Fergusson & Horwood, 2000). Using proportional hazards modelling the ways in which risks of other illicit drug use varied with exposure to cannabis were examined. The particular strength of this study lies in the fact that it begins to provide evidence consistent with the essential requirements for a causal explanation, that is demonstrating a consistent temporal sequence, a dose/response relationship, resilience to control for confounding and specificity of the association when the effects of other contemporaneous risk factors were taken into account. They found that by the age of 21 years, nearly 70% of the cohort had used cannabis and 26% had used other illicit drugs. In all but three cases the use of cannabis had preceded the use of illicit drugs. The risks of progression were mainly among those who used cannabis weekly or more frequently. After adjusting for confounders including childhood, family and adolescent life-style factors, those using cannabis more than 50 times a year were 59 times more likely to use other illicit drugs than non-users.

The findings from longitudinal studies such as those reported by Coffee et al (2000) and Fergusson and Horwood (2000) are important in clarifying the 'gateway' debate and the actual extent to which more regular cannabis use increases the risk for other substance use. They also indicate the way this relationship appears to be mediated by adolescents' affiliations with substance using peers and by other processes which seem to play a lesser role in the way cannabis use progresses to other substance use. Whilst keeping in mind the fact that cannabis use remains occasional for the vast majority of adolescents, the balance of the evidence reviewed nevertheless points to the potential utility and likely health gain of prevention strategies which aim to delay the early onset and regular use of this substance.

3.1.3 Other illicit drugs

After cannabis, the next most frequently used illicit drugs in the Australian population are amphetamines, synthetic hallucinogens/LSD, and opiates (including heroin and methadone) (Australian Institute of Health and Welfare, 2000). Apart from the literature indicating the potential for amphetamines and synthetic hallucinogens to trigger latent psychosis in some vulnerable individuals there does not appear to be any studies, apart from individual case reports, which have demonstrated a specific association between ecstasy/designer drugs, cocaine or inhalants and suicide (Sperry & Sweeney, 1989). However, there are a number of reports indicating elevated rates of suicide and suicidal behaviour among opiate users (Oyefeso, Ghodse, Clancy, & Corkery, 1999).

Heroin and methadone overdose deaths have increased markedly over the past decade in Western Australia and elsewhere in Australia. The prevailing clinical view that the increase in such fatalities is largely attributable to variations in purity of street heroin (Australian Institute of Health and Welfare, 2000; Darke, Ross, Zador, & Sunjic, 2000). While individual variation in susceptibility to increased drug purity may arise from temporary drug abstinence (or use of naltrexone) or the effects of polydrug use, there is no evidence to suggest that either of these alternate explanations account for the overall increase in overdose deaths (Miotto, McCann, Rawson, Frosch, & Ling, 1997). However, as it is often difficult to differentiate accidental from intended overdose, it has been suggested that a proportion of the observed increase may be accounted for by some of these deaths being undetected suicides (Kjelsberg, Winther, & Dahl, 1995).

Follow-up studies of opioid addicts in Australia and overseas indicate that almost all deaths of addicts are unnatural deaths, that is drug overdoses, suicides, accidents and homicides (Darke et al, 2000). A

20-year follow up of a cohort of 9,491 registered addicts in the UK found teenage addicts were about 12 times more likely to die as teenagers and six times as likely to suicide than non-addicts (around 11% of the teenage specific deaths in the group were due to suicide) (Oyefeso, Ghodse, Clancy, Corkery, & Goldfinch, 1999).

There are several studies which show a high aggregation of substance use and mental disorders in the families of substance users with parental alcohol abuse strongly correlating with poor outcome (Brent, 1995; Kaminer, 1996). In all the studies reviewed (including those in Appendix A) the high prevalence of co-morbidity between affective and psychoactive substance use disorders is significant regardless of the sequence of onset - the diagnoses of substance misuse were often combined with diagnoses of depression (Tunving, 1985; Tunving & Nilsson, 1985).

Addicts with depressive co-morbidity seem to run an especially high risk of completing suicide (Bukstein et al, 1993). The high levels of co-morbid depressive disorder found among addicts is consistent with the “self-medication” hypothesis which contends that some drug-dependent individuals are predisposed to addiction because they suffer painful affect states, such as depression or rage and that they use the drugs as a means of medicating their affective disorder (Khantzian, 1985).

The question of whether those addicts with higher levels of depression or other psychiatric disorder have increased risk for suicide was addressed in a Norwegian prospective follow-up study of 1,696 adolescent psychiatric inpatients over 15 years. This study described the differentiating features of 39 of the cases who subsequently died from overdoses (mostly opiates), in comparison with 39 surviving controls and 35 suicides from the same patient population (Kjelsberg et al, 1995). They found that the suicide group had generally more psychiatric symptoms and suicidal ideation. However, no significant differences were observed between the overdose cases and their surviving controls. This suggests that the majority of overdose deaths in young drug addicts are accidental poisoning and not misclassified suicides.

3.1.4 Multiple drug use

A consistent feature of studies of fatal overdoses and suicide is the finding that a range of substances including opiates, alcohol and a variety of prescription drugs are often involved. In the UK it has also been shown that such polypharmacy is more likely to be associated with more severe social and psychiatric problems (Farrell, Neeleman, Griffiths, & Strang, 1996). In an early meta-analysis of published findings of suicide in specific mental disorders, the risk associated with multiple drug use was found to be among the highest of all risk factors (Harris, Linn, & Hunter, 1979).

A similar association with suicide attempt was confirmed by Borges et al’s (2000) analysis of the US National Comorbidity Survey data. The findings clearly demonstrated that, after controlling for the confounding effects of socio-demographics and mental disorders, the strength of association was very similar for each of the individual drugs studied and that major risks for suicide attempt were associated with the number of drugs used. They found a significant and monotonic increase in the risk of first suicide attempt with the number of substances used. The range of odds ratios increased dramatically from a low of 2.6 associated with use of only one substance (compared with respondents who had not used any). This risk increased incrementally to 4.2 (95% CI 2.0 - 8.5) for those using two substances, 6.4 (95% CI = 3.3 – 12.3) for three substances, 11.3 (95% CI = 5.0 – 25.7) for four substances, 14.6 (95% CI = 6.9 – 31) for five substances, and to 27.4 (CI = 6.5 – 116) for those using six or seven substances.

3.2 Co existing disorders

No author claims that suicide is the consequence of one single cause, but most note that it is more plausibly a combination of many factors (Mino et al, 1999). The consensus of the psychological autopsy studies reviewed earlier in this report is that the vast majority of people who completed suicide were suffering from more than one current mental disorder (including drug use) (Isometsae et al, 1997). The recent UK report on suicide and homicide by people with mental illness (National Health Service (UK), 1999), and the Coronial record study of suicide in Western Australia (Hillman et

al,2000) both confirm the high level of the co-morbidity of suicide with depression, other psychiatric illness and alcohol and other drug use.

Beautrais et al's (1998) study of medically serious suicide attempts has also highlighted the significance of co-morbidity in attempted suicides. More than half the young people in their New Zealand study met DMS-III-R criteria for two or more disorders, specifically affective disorders, substance use disorders and antisocial disorders. They found that those individuals with two or more disorders had increased odds of serious suicide attempt, four to five times that of individuals with one disorder, and 40 times that of individuals with no disorder. A knowledge of the key risk factors and life processes resulting in co-morbid conditions which lead to the onset of suicidal behaviour is thus important both for the development of prevention strategies and for their effective treatment.

Substance use and suicidal behaviour have long been thought to reflect similar types of underlying psychopathology. Inspection of the literature shows that both conditions have many aspects in common in terms of key risk factors and the risk settings where these conditions arise. Table 11 (p.67) summarises the extent to which risk factors for substance use and suicidal behaviour overlap. For both groups of disorder similar patterns of risk are observed in terms of social background, family and childhood environment, personality and temperamental factors, mental health disorders, stressful life events and circumstances (Diekstra et al,1995).

However, by far the strongest correlates of suicidal behaviour and substance use relate to an individual's psychiatric state around the time of the suicidal behaviour (Fergusson et al, 2000). In particular, mood disorders emerge as one of the strongest predictors of suicidal behaviours (Beautrais et al, 1998; Brent, Perper, Moritz, & Baugher, 1993). However, risk of suicidal behaviour is also linked to a number of other disorders including substance use and dependence; conduct disorders; anxiety disorders; and psychoses (Fombonne, 1998; Patton et al, 1997; Shaffer et al, 1996).

Substance use as a co-morbid disorder would appear to have a number of direct and indirect effects in increasing the risks for suicide by: increasing the likelihood of other psychiatric symptoms (depression and anxiety, for example); exacerbating stressful life events (interpersonal losses, for example); increasing isolation from supportive peers, family, and other adults; and/or attenuating cognitive appraisal and the inhibitions against risk behaviours that in turn increase the risk of suicide (Forman & Kalafat, 1998; Kaminer, 1996; Weiss & Hufford, 1999).

It has also been suggested that certain categories of substance use correspond to, and may be an early indicator of, serious forms of depressive disorders in which feelings of despair and hopelessness are common features (Madianos et al, 1994). The hopelessness that derives from social distress may lead an individual to seek relief in substance use; thus substance use becomes a secondary barometer of a disturbed life situation (Levy & Deykin, 1988). In this context, substance use may initially be a palliative coping reaction for dealing with unaccepted feelings and surviving stressful circumstances (Downey, 1991; Khantzian, 1985; Kienhorst et al, 1992).

Substance abuse and early psychosis have long been known to be strongly associated and provide a setting where the risks for suicide may be temporarily elevated. Not only does the onset of psychosis typically coincide with the ages when substance use is most common, but also the intake of many substances increases the risk of psychosis onset. People with a dual diagnosis, that is those having a psychosis who also use alcohol and other drugs, have generally poorer functional and symptomatic outcomes than those without this co-morbidity. They are more likely to need emergency services and hospitalisation, and they often constitute the heaviest users of community services, including shelters for the homeless.

The often inappropriate clinical management of people with dual diagnosis is another factor increasing their risk for adverse outcomes such as suicide (Hillman et al, 2000). This includes the common failure to detect and treat both conditions; the fact that dual diagnosis may exclude some individuals from services that have the potential to help them (i.e. drug & alcohol services or psychiatric services),

and; the difficulties in maintaining these patients in treatment and understanding the need to also manage their substance use (Appleby, 2000).

It has also been recognised that the use of alcohol and other drugs can result in almost all types of psychopathology, including severe states of anxiety, aggression, and depression, acute psychosis, and severe confusion (Jones, 1997). High proportions of people with psychiatric illness are also known to have alcohol and other drug problems. Intoxication resulting from alcohol and/or other drug use often immediately precedes suicidal behaviour, and it has been suggested that both depressants (e.g. alcohol) and stimulants (e.g. cocaine) can impair judgement and cognitive processing (problem solving), increase impulsivity, and produce severe mood disturbances such as intense suicidal depression (Hawton, 1994). Alcohol and other drug use disorders may also intensify pre-existing depressive and psychotic disorders (Kaminer, 1996), or cause acute toxic states that can have lethal consequences (Downey, 1991). It is thus difficult to ascertain the extent to which depression causes substance use, or substance use causes depression, or whether both processes are involved in the downward spiral ending in suicide (Harris et al, 1979; Jones, 1997; Kaminer, 1996).

The relative importance of such causal pathways has recently been investigated by Borges et al (2000) using data from clinical interviews conducted with subjects aged 15-54 years who had been identified as having co-morbidity of either suicidal behaviour, mental disorders or substance use in the US National Co-morbidity Survey, a nationwide survey of over 8,000 participants. Among the sample, those with alcohol and other substance dependence were generally more likely to have attempted suicide.

However, for those with co-existing mental disorders in addition to such dependence, the use of alcohol or other drugs was significantly more likely than the history of mental disorder to have led directly to the attempt. Current substance use alone, with or without a history of dependence, was associated with impulsive suicide attempts and thoughts of suicide. The use of either depressant or stimulant drugs was equally likely to elicit suicidal thoughts and attempts. Additionally, substance use disorders were not found to be associated with the planning of a suicide but were more closely associated with suicidal thoughts and unplanned attempts. These findings highlight that the risks associated with disinhibition from occasional intoxication may be as great as those associated with substance dependency problems, particularly where there is an underlying disorder such as depression.

3.3 Summary

3.3.1 Is there an association between rising rates of suicide and alcohol and other drug use?

It is now generally accepted that the rise in suicide among younger age groups over the past few decades has been associated with secular changes in the use of alcohol and other drugs (Shaffer et al, 1996). Excessive blood alcohol levels and evidence of other drug use are common among suicides by persons of all ages but are particularly frequent among males (Hillman et al, 2000). Alcohol and other drug use appears to increase risk of suicide both through the direct short-term effects of intoxication increasing the likelihood of impulsive suicide, and through the indirect effects of longer-term use and/or dependency resulting in accumulating psychosocial stress triggering, or exacerbating, existing co-morbid mental health disorders (Forman & Kalafat, 1998; Kaminer, 1996; Weiss & Hufford, 1999).

3.3.2 Does substance use make an independent contribution to the risk of suicide?

Co-morbid mental health disorders such as depression, personality disorders and schizophrenia are recognised to account for the major portion of the association between substance use and suicidal behaviour (Commonwealth Department of Health and Aged Care, 1999). However, there is also good evidence from the recent landmark US Co-morbidity Survey which shows that after controlling for socio-demographic factors and lifetime prevalence of mental health disorders, there is a significant residual risk for suicidal ideation and attempts associated with substance use and/or dependency

(Borges et al, 2000). The mechanism of this association appears to be primarily through the disinhibiting effects of intoxication and its attenuation of cognition, both increasing the risk of impulsive suicide (Neeleman & Farrell, 1997).

3.3.3 Is the association of substance use specific to particular substances?

The association between substance use and suicidal behaviour is found across a wide array of drugs and does not appear to be limited to only substances with certain pharmacological properties. While it was generally thought that depressants (i.e. alcohol, tranquillisers) were stronger predictors of suicide and suicidal behaviour (Taylor & Chermack, 1993), the evidence from the US National Co-morbidity Study indicates that for adults and youth aged 15 and over, the number of substances used is more important than the type of substances used in predicting suicide attempt (Borges et al, 2000). While the use of some substances (e.g. inhalants or opiates) has high associated risks for suicidal behaviour, their prevalence is relatively low. By contrast alcohol and/or cannabis use are much more prevalent. In terms of attribution these two substances would appear to make the greatest contribution to the population prevalence of suicidal behaviour and should therefore both be primary targets for prevention.

3.3.4 What contribution does cannabis use make to suicide risk?

There is only one population study which has directly linked cannabis use with increased risk of suicide mortality (Andreasson & Allebeck, 1990). While Beautrais et al's (1998) case-control study has shown a significant (ten-fold) elevated risk for suicide attempts associated with cannabis use, the major proportion of this risk was accounted for by co-morbid mental health problems and socio-demographic disadvantage. More recently, evidence from the large-scale US National Co-morbidity Survey has shown that when the confounding factors of socio-demographic background and co-morbid mental health problems are taken into account, the regular use of cannabis remains significantly associated with a two-fold increased risk for non-fatal suicide attempts (Borges et al, 2000). While this level of risk would generally indicate a 'weak' causal factor in predicting suicide risk for an individual, its high prevalence means that, at the population level, it independently accounts for a sizeable proportion of all suicide attempts.

3.3.5 Do hazardous levels of alcohol consumption increase suicidality?

The association between suicide and alcohol has been substantiated by a number of population and clinical studies including those with alcoholics (Allebeck & Allgulander, 1990b; Beck & Steer, 1989; Black et al, 1986; Driessen et al, 1998; Frances et al, 1987; Motto, 1980; Murphy, 1988; Schuckit, 1986) and suicidal populations (Borges et al, 2000; Hayward et al, 1992; Hillman et al, 2000; Williams & Morgan, 1994). These studies report the high prevalence of alcohol intoxication among people who complete suicide. The use of alcohol in suicide attempts may increase the effect of other drugs also taken (particularly those that can suppress respiration) (Williams & Morgan, 1994) and must also be considered a risk factor, even in the absence of abuse or dependence, in impulsive, spur-of-the-moment suicides due to its disinhibiting properties.

3.3.6 How is suicidal behaviour best understood?

The currently available evidence supports a life course model of the development of suicidal behaviour in which an individual's risk of suicide is determined by his/her accumulative exposure to a wide range of risk factors, spanning social disadvantage, family and childhood adversity, personality, current mental health, and exposure to recent adverse life-events (Fergusson et al, 2000). More specifically, these include: the use of alcohol and/or other drugs, personality disorder, depression, having a history of deliberate self-harm, and having a history of psychiatric treatment or interpersonal conflicts (Johnsson & Fridell, 1997; Tondo et al, 1999). Understanding the key risk factors and life processes resulting in co-existing conditions leading to the onset of suicidal behaviour is thus important both for the development of prevention strategies and for their effective treatment.

The next section of this report presents an analysis of the currently available Coronial and toxicology data on completed suicide with the aim of establishing a perspective on the saliency of the above issues in the Western Australian context.

4. Analysis of WA coronial and toxicology data

4.1 Method

A retrospective audit of Coronial files was conducted and data entered into the Coroner's Database on Suicide in WA. These data were then analysed with regard to the study's objectives. This section of the report summarises the processes involved in obtaining the data on suicide for the Coroner's Database as well as providing definitional guidelines for the terms used throughout this report.

4.2 Classification of suicide in Western Australia

Data collection procedures with regard to suicide vary between states and territories throughout Australia. In Western Australia the Coroner's Act requires a verdict of suicide if the Coronial investigation reveals the death was intentionally self inflicted. If there is any doubt the case will not be classified as a suicide and the benefit of doubt is given to the deceased. "Suicide should never be presumed, but must always be based on some evidence that the deceased intended to take his (or her) own life" (Matthews & Foreman, 1993, p.13). In effect, this means that there must be overwhelming evidence that the deceased intended to take their own life. This is generally inferred from the circumstances relating to the discovery of the body, from a note or statement, or from reports that the person was threatening to take their own life. The lack of such evidence may result in an open verdict being returned. Once finalised, the Coroner's findings of the cause of death are forwarded to the Registrar General.

Research is reliant on the consistency and accuracy of the reporting of the event of suicide. While it is recognised that the conservative nature of a non-presumptive determination of suicide may contribute to the possible under reporting of cases, it nevertheless provides a reliable method of ascertaining cases for inclusion in the WA Coroner's Database (Hillman et al., 2000).

4.3 Western Australian Coroner's database

The Western Australian Coroner's database on suicide is maintained by the TVW Telethon Institute for Child Health Research (Institute) on behalf of The WA Youth Suicide Advisory Committee (YSAC) and the Western Australian Coroner's Office. Coronial files with cause of death findings as suicide are examined on a regular basis and information concerning the suicide is extracted and coded. Coronial records contain statements from witnesses, family and friends of the deceased, hospital and medical reports, post mortem results, toxicology results, psychological reports and the Coronial investigative officer's summary and recommendation. The information recorded in these files attempts to provide the Coroner with a holistic understanding of the deceased's history and life circumstances prior to death.

The systematic recording of these data in the Coroner's Database commenced in January 1986 and continues to provide Western Australia with an important means of epidemiological surveillance and monitoring of trends. Some slight differences in figures between those shown in this report and figures from the Australian Bureau of Statistics (ABS) may be present. This is largely due to a difference in data collection timing. Data for the Coroner's Database is not collected until the Coronial investigation has been completed and the death ruled a suicide by the Coroner (Hillman et al., 2000).

4.4 Database linkages and confidentiality

The data were linked to the Health Department of Western Australia's (HDWA) Mental Health Information System. This was done with the authorisation and supervision of the HDWA's Confidentiality of Health Information Committee (CHIC). This linkage has enabled information on the clinical history of those individuals who had been treated within the mental health system in Western Australia to be recorded. This information included the number of psychiatric hospital and clinic admissions, dates of the first and last psychiatric admissions, and the diagnosis provided at these times.

Toxicology information gathered from Coronial records was referred back to the Chemistry Centre of WA for an assessment of the lethality of each substance found for each case. This allowed for an accurate evaluation to be made of the drugs and chemicals detected within each case and the relationship to his or her death (Hillman et al., 2000).

4.5 Definitions

For the purpose of this analysis the following definitions have been used to describe key variables.

Substance use

Whether a young person had a substance use issue was derived from statements of family, friends or professionals within the Coronial file. These statements must refer to a drug or drugs that were used by the deceased on a regular basis and were seen to be affecting his/her life in a negative way in the three months prior to their death. Both regular use and dependence would be categorised here. This definition is not as stringent as that in the DSM IV. Recreational or occasional drug use is not included as a substance use issue. The emphasis is on being a harmful or dependent user with negative effects resulting from this use (e.g. family conflict, dependence, homelessness, financial problems, ill health, withdrawal symptoms, legal issues etc).

Young person

This refers to the group of people aged 15 to 24 years inclusive. This age range is consistent with Australian Bureau of Statistics categorisation of youth. All of the young people in the study were determined by the Coroner to have died by suicide.

ICD9 Codes

These codes are an international classification of diseases. Suicide and self-inflicted injury are classified with 'E' codes. These codes are detailed in Appendix B.

Opiates

The ICD-9 codes do not distinguish between suicide by heroin or other analgesics. As such the term opiates as used in this report refers to the overarching group of analgesics. This is particularly relevant in the 'types of suicide' analysis and the toxicology results. Drugs of use prior to death also group all analgesics together.

Illicit drugs

Drugs included here were categorised into cannabis, opiates, stimulants, hallucinogens and inhalants. In view of the very small numbers of suicides where inhalants were detected these substances were included within the group of illicit drugs for the purpose of this analysis.

Toxicology

Refers to the post-mortem blood analysis conducted. This analysis screens for alcohol, prescription, illicit and over the counter drugs as well as other substances that may be present.

Stressors

Life stress events (real or perceived) reported to have occurred in the 12 months prior to the person's suicide. Stressors, which were reported to have been negative or stressful for the person, were recorded. The most common of these were categorised as follows.

- *Financial* – Concerns or problems over money or assets.
- *Relationship* – The break-up of a relationship which was still affecting the person.
- *Death of other* – The death of a loved one, e.g. parent, spouse or child, including abortion or miscarriage.
- *Legal issues* – Trouble with the law, recent incarceration, recent arrest etc.
- *Unemployment* – Recent loss of a job or long term unemployment.
- *Drug use* – A substance use issue.

- *Family problems* – Problems with parents, spouses etc causing stress for the individual.
- *Abuse as a child* – Sexual, physical or emotional (only collected since 1996).
- *Sexuality* – Issues with sexuality, sexual identity, gay, lesbian or bi-sexual (only collected since 1996).
- *Physical illness, Old age, Loneliness, Psychiatric illness and Chronic pain* - self-explanatory.

4.6 Data analysis

Age Standardised and age adjusted rates were calculated using the Rates Calculator (Codde, 1998). This program calculates age-standardised rates using the direct method. Age standardisation uses a standard population (the Australian 1991 population was used in this report) to eliminate the effects of differences in the age structure of various populations. This allows comparisons between groups with different age compositions. Both Age standardised and age adjusted rates are expressed per 100,000 population. Confidence intervals define the range of values within which the rate is likely to lie (Hillman et al., 2000). SPSS was used to manage the data and for any further analysis of significance undertaken.

4.7 Study population

A total of 2732 people died by suicide in the period 1986 to 1998, 571 of these were young people aged between 15 and 24 years. Young people in this age group accounted for 21% of all suicides during this 13-year period. As shown in Figure 1, 170 (30%) of these young people had illicit drugs detected in their toxicology analysis.

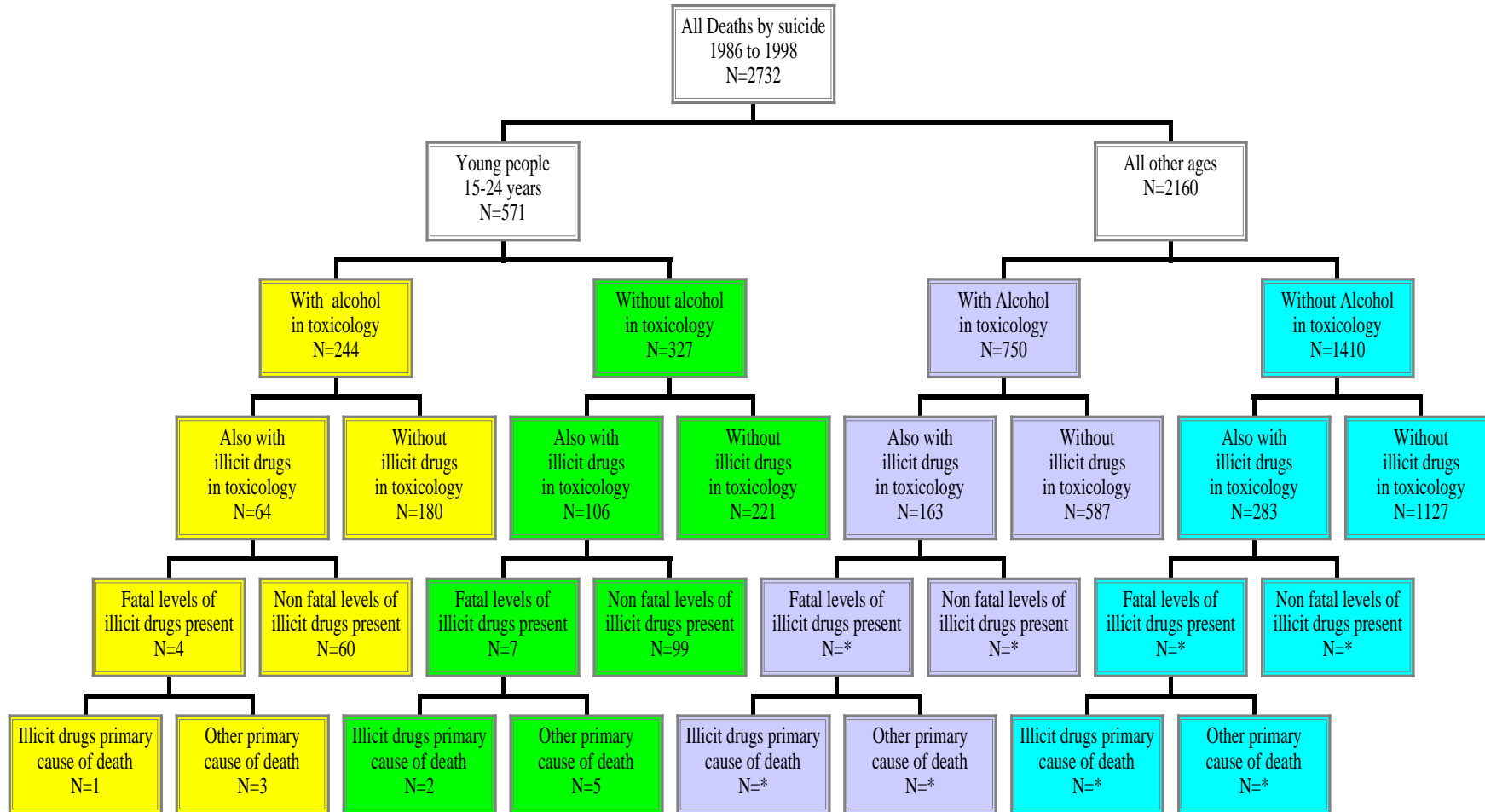
Young males accounted for 86% (n=490, AAR: 28.1 per 100,000) of all suicides for people aged 15-24 years and young females 14% (n=81, AAR: 4.9 per 100,000), a ratio of 5.7:1 (see Table 1). The rate of suicide in young people has remained steady over the thirteen year period, however in 1998 a rise occurred in the rate for young males from 25.3 per 100,000 in 1997 to 40.6 per 100,000 in 1998. Continued monitoring of suicide amongst young males during the next few years will be necessary in order to determine whether this rise is a one off phenomenon or the beginning of a trend.

Table 1: Number and rates of suicide, young people Western Australia, 1986 to 1998

	15-19		20-24		15-24			
	M	F	M	F	Males		Females	
	n	n	n	n	n	AAR	n	AAR
1986	7	1	16	4	23	18.1	5	*
1987	8	6	10	1	18	13.9	7	*
1988	18	3	20	2	38	29.1	5	*
1989	16	2	18	0	34	25.7	2	*
1990	10	2	28	2	38	28.7	4	*
1991	12	2	27	7	39	29.1	9	*
1992	16	3	29	5	45	33.3	8	*
1993	18	2	19	4	37	27.5	6	*
1994	12	0	29	1	41	30.0	1	*
1995	13	0	29	8	42	30.6	8	*
1996	6	3	37	5	43	31.1	8	*
1997	10	5	25	5	35	25.3	10	*
1998	16	1	41	7	57	40.6	8	*
Total	162	30	328	51	490		81	
AAR 86-98						28.1		4.9
ASR 86-98	18.8		37.2					

Notes: ASR = Age standardised rates; rates are calculated using the Australian 1991 population estimates
AAR = Age adjusted rates; rates are calculated using the Australian 1991 population estimates
* = Too few numbers to convert to an AAR

Figure 1: Suicide in Western Australia, 1986 to 1998, study population parameters

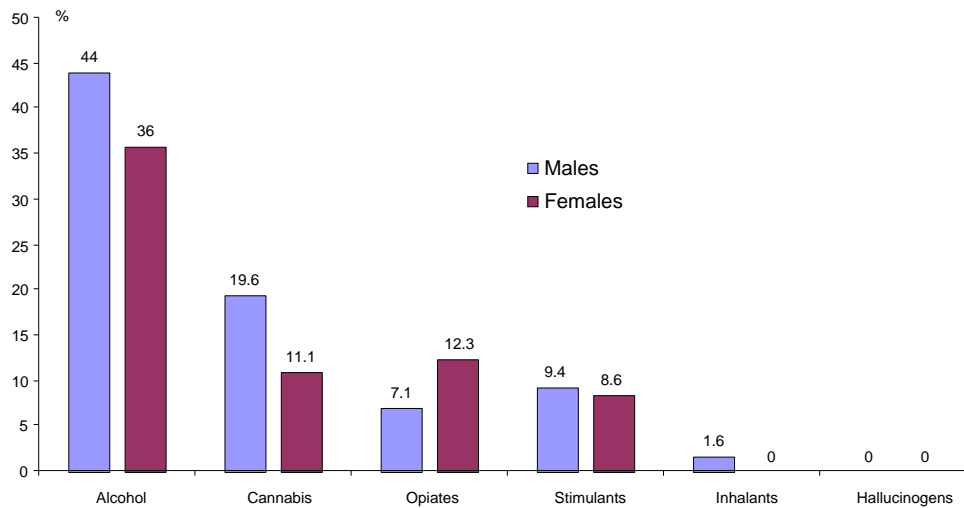


* Data not yet available

4.8 Alcohol and illicit drugs identified in the post mortem analysis

Half of the females and almost two thirds of the males recorded positive toxicology results for either alcohol or illicit drugs. The most common drugs detected in the bloodstream for males were alcohol (44%), cannabis (19.6%) and stimulants (9.4%). For females the most common drugs detected were alcohol (36%), opiates (12.3%) and cannabis (11.1%) (see Figure 2). This is consistent with findings of psychological autopsy studies throughout the world (Harris & Barraclough, 1997).

Figure 2: Illicit drugs detected in post-mortem toxicology



Note: Up to 6 substances are recorded for each person’s toxicology analysis.

4.8.1 The presence of illicit drugs

Nearly one third of young males (30%) and over a quarter of young females (28%) in this study tested positive for illicit drugs (alcohol excluded) in their post-mortem blood toxicology analysis (see Table 2). Positive drug results were highest in the 20-24 year age group for both males and females. This may reflect the easier ability of this age group to obtain illicit drugs, as they would tend to have more freedom and more disposable income. The influence of a peer group favourable to drug taking may also exert some influence on this age group.

Table 2: Illicit drugs detected in post-mortem toxicology by gender and age group

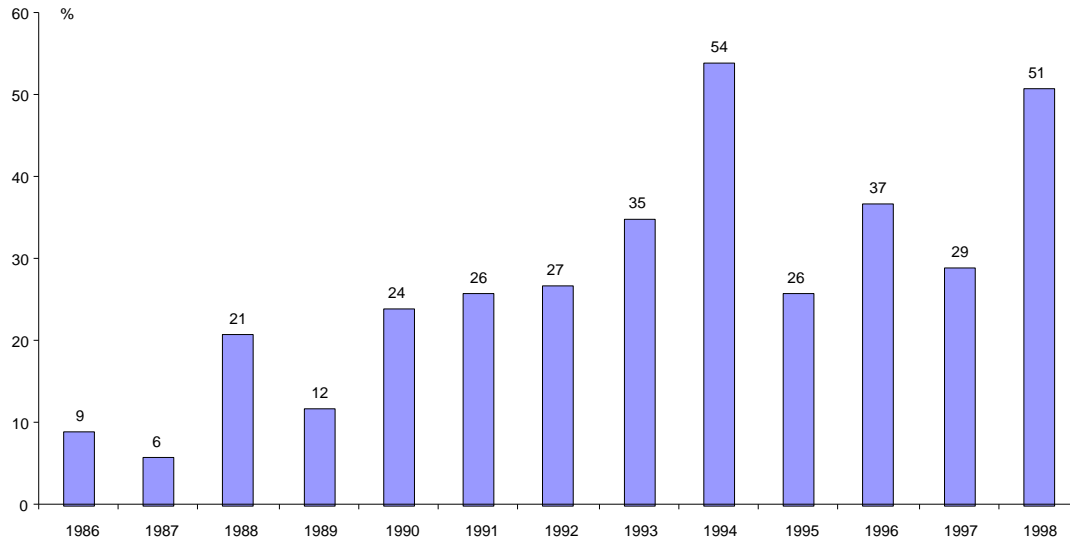
	Males		Females	
	15-19	20-24	15-19	20-24
No illicit drugs in toxicology	118 (73%)	225 (69%)	25 (83%)	33 (65%)
Illicit drugs in toxicology	44 (27%)	103 (31%)	5 (17%)	18 (35%)
Total	162 (100%)	328 (100%)	30 (100%)	51 (100%)

Note: Up to 6 substances are recorded for each person’s toxicology analysis.

There have been two years during the study period where the number of males with illicit drugs in their toxicology analysis was significantly high, $\chi^2 (12, N=147) = 42.849, p < .05$ (see Figure 3). These

years were 1994 and 1998. Both these years also show an increase in the detection of cannabis in male post-mortem toxicology analysis to nearly double the average incidence (39% and 40% respectively, average 20%). The rise in 1998 also coincides with a rise in rate for male youth suicides in that year (to AAR 40.6 per 100,000) (see Table 3).

Figure 3: Illicit drugs detected in post-mortem toxicology, males, by year



Note: Female numbers too few to be included in this figure.

4.8.2 Methods of suicide

The most common methods of suicide for males, with or without the presence of illicit drugs were hanging and carbon monoxide poisoning. For females with no illicit drugs in their toxicology, the most common methods of suicide were hanging and overdose while for those females with illicit drugs present the most common methods of suicide were hanging and carbon monoxide poisoning (see Table 3). No significant differences in the method of suicide were observed between those young people with illicit drugs in their post-mortem toxicology analysis and those without. The methods of suicide used by youth are essentially the same as those by all other age groups over the same period in WA (Hillman et al., 2000).

Table 3: Illicit drugs detected in post-mortem toxicology, by gender and method of suicide

ICD9 codes	Type of suicide	Males				Females			
		No illicit drugs in toxicology		Illicit drugs in toxicology		No illicit drugs in toxicology		Illicit drugs in toxicology	
		n	%	n	%	n	%	n	%
E957.0-E957.9	Jumping from high place	7	2.0	2	1.0	2	3.5	3	13.0
E955.0 -E955.9	Firearms	51	15.0	21	14.0	6	10.0	1	4.0
E953.0 -E953.9	Hanging	153	45.0	70	48.0	20	35.0	8	35.0
E954.0	Drowning	4	1.0	0	0	3	5.0	0	-
E952.0 E952.9	Carbon monoxide poisoning	96	28.0	30	20.0	9	15.5	6	26.0
E950.0 -E950.5	Overdose	9	2.5	16	11.0	11	19.0	2	9.0
E950.6 -E950.9	Non medicinal poisoning	2	0.5	0	0	3	5.0	0	-
E956.0	Cutting	5	1.5	1	1.0	0	-	0	-
E958.1 -E958.9	Other	5	1.5	3	2.0	2	3.5	0	-
E958.0	Collision with moving vehicle	11	3.0	4	3.0	2	3.5	3	13.0
Total		343	100.0	147	100.0	58	100.0	23	100.0

4.8.3 Geographical differences

The majority of young male suicides where illicit drugs were detected in the post-mortem toxicology analysis lived in the Perth metropolitan area (see Table 4). For females the majority were in the remote area, however the numbers here are very small (n=3) and care must be taken when interpreting these results. Appendix C details the Health Zone and metropolitan, rural and remote boundaries in the State.

Table 4: Illicit drugs detected in post-mortem toxicology, by geographical location

	Males			Females		
	Metro	Rural	Remote	Metro	Rural	Remote
No illicit drugs in toxicology	229* (68%)	72 (78%)	41 (71%)	47* (72%)	5 (71%)	5 (62%)
Illicit drugs in toxicology	110 (32%)	20 (22%)	17 (29%)	18 (28%)	2 (29%)	3 (38%)
Total	339 (100%)	92 (100%)	58 (100%)	65 (100%)	7 (100%)	8 (100%)

Note: * = A case was unable to be classified due to incomplete residential details

4.8.4 Unemployment

The majority of young people who were unemployed at the time of their suicide did not have illicit drugs in their toxicology analysis (see Table 5). Females who completed suicide and were unemployed were significantly less likely to have a positive toxicology analysis for illicit drugs, $\chi^2 (1, N=81) = 4.781, p < .05$.

Table 5: Illicit drugs detected in post-mortem toxicology, by employment status

	Males		Females	
	Unemployed	Employed*	Unemployed	Employed*
No illicit drugs in toxicology	138 (73%)	205 (68%)	22 (88%)	36 (64%)
Illicit drugs in toxicology	51 (27%)	96 (32%)	3 (12%)	20 (36%)
Total	189 (100%)	301 (100%)	25 (100%)	56 (100%)

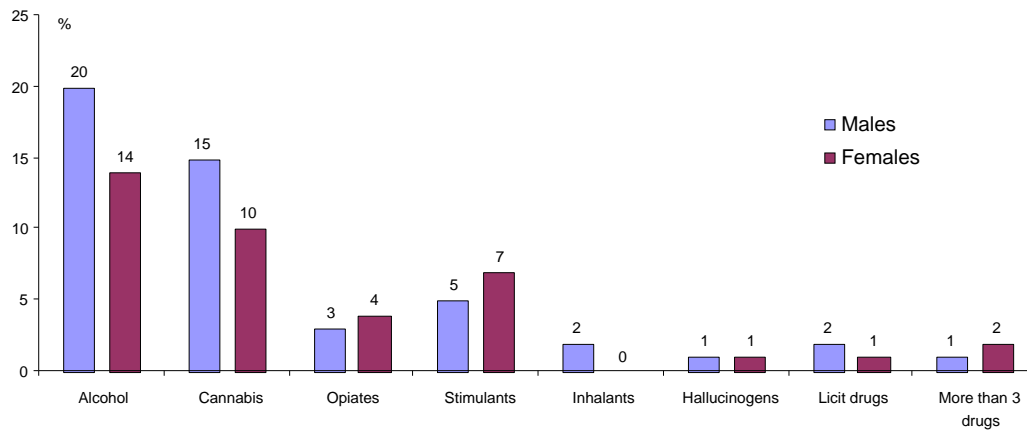
Note: Employed* also included those not in the work force such as full-time students, home duties, prisoners and pensioners.

4.8.5 Previous drug use

Of the 490 males aged between 15 and 24 in this study, 162 (33.5%) had been identified by family or friends as having a substance use issue in the three months before their deaths. Eighteen of these males had also been treated in detoxification programs. Over a quarter of females (29.5%) also had a substance use issue. The main drugs used for both males and females were alcohol and cannabis (see Figure 4).

As would be expected, family or friends having reported a substance use issue was significantly associated with the presence of a post-mortem toxicology analysis for illicit drugs. This association was more pronounced for males, $\chi^2 (1, N=490) = 22.034, p < .05$. However, it should also be noted that around one in five male and female suicides (23% and 21% respectively) who were not known to be substance users were found to have illicit drugs present in their post-mortem toxicology analysis at the time of their death (see Table 6).

Figure 4: Drugs used prior to suicide



Note: Up to 3 drugs could be identified for each person.

Table 6: Illicit drugs detected in post-mortem toxicology, by substance use history

	Males		Females	
	Substance use history	No substance use history	Substance use history	No substance use history
No illicit drugs in toxicology	91 (56%)	252 (77%)	13 (54%)	45 (79%)
Illicit drugs in toxicology	71 (44%)	76 (23%)	11 (46%)	12 (21%)
Total	162 (100%)	328 (100%)	24 (100%)	57 (100%)

4.8.6 Psychiatric history

Twenty five percent of males and 41% of females in this study had been diagnosed with a psychiatric illness in the 12 months before their death. With regard to having a psychiatric disorder, there was no significant difference between those young people having illicit drugs present in their post-mortem toxicology analysis and those who did not (see Table 7).

However, the percentage of young people with illicit drugs present in their toxicology analysis did differ depending on the type of psychiatric disorder they were diagnosed with. Twenty one percent of males with a diagnosed schizophrenic disorder compared to 33% with a diagnosed depressive disorder had illicit drugs detected in their post-mortem toxicology analysis. Also 29% of females with a schizophrenic disorder compared to 47% with a depressive disorder had illicit drugs present in their post-mortem toxicology analysis.

Table 7: Illicit drugs detected in post-mortem toxicology, by diagnosed psychiatric illness

	Males		Females	
	Diagnosed psychiatric illness	No diagnosed psychiatric illness	Diagnosed psychiatric illness	No diagnosed psychiatric illness
No illicit drugs in toxicology	84 (69%)	259 (70%)	21 (64%)	37 (77%)
Illicit drugs in toxicology	37 (31%)	110 (30%)	12 (36%)	11 (23%)
Total	121 (100%)	369 (100%)	33 (100%)	48 (100%)

4.8.7 Aboriginality

There were 52 young Aboriginal males who completed suicide during the study period. One quarter of these had illicit drugs present in their toxicology analysis. Four young Aboriginal females also completed suicide and two of these had a positive toxicology analysis for illicit drugs. Contrary to common stereotypes fewer young Aboriginal males who completed suicide had illicit drugs detected in their toxicology analysis than non-Aboriginal males (25% and 31% respectively), however this difference was not statistically significant.

4.8.8 Deaths in custody

There were a total of fourteen young suicides (aged 15-24 years) in custody over the thirteen-year period of this study, with 50% having illicit drugs in their toxicology analysis. Only one female death in custody occurred and in this case there were no illicit drugs detected.

4.8.9 Previous suicide attempts

Of the 490 young male suicides in this study 29% (n=144) had previously attempted suicide, as had 54% (n=44) of young females. Those with and without a history of suicide attempts did not differ in terms of the proportion having illicit drugs detected by post-mortem toxicology and those who did not (see Table 8).

Table 8: Illicit drugs detected in post-mortem toxicology, by previous suicide attempt

	Males		Females	
	Previous suicide attempt	No previous suicide attempt	Previous suicide attempt	No previous suicide attempt
No illicit drugs in toxicology	102 (71%)	241 (70%)	31 (70%)	27 (73%)
Illicit drugs in toxicology	42 (29%)	105 (30%)	13 (30%)	10 (27%)
Total	144 (100%)	346 (100%)	44 (100%)	37 (100%)

4.8.10 Precipitating circumstances

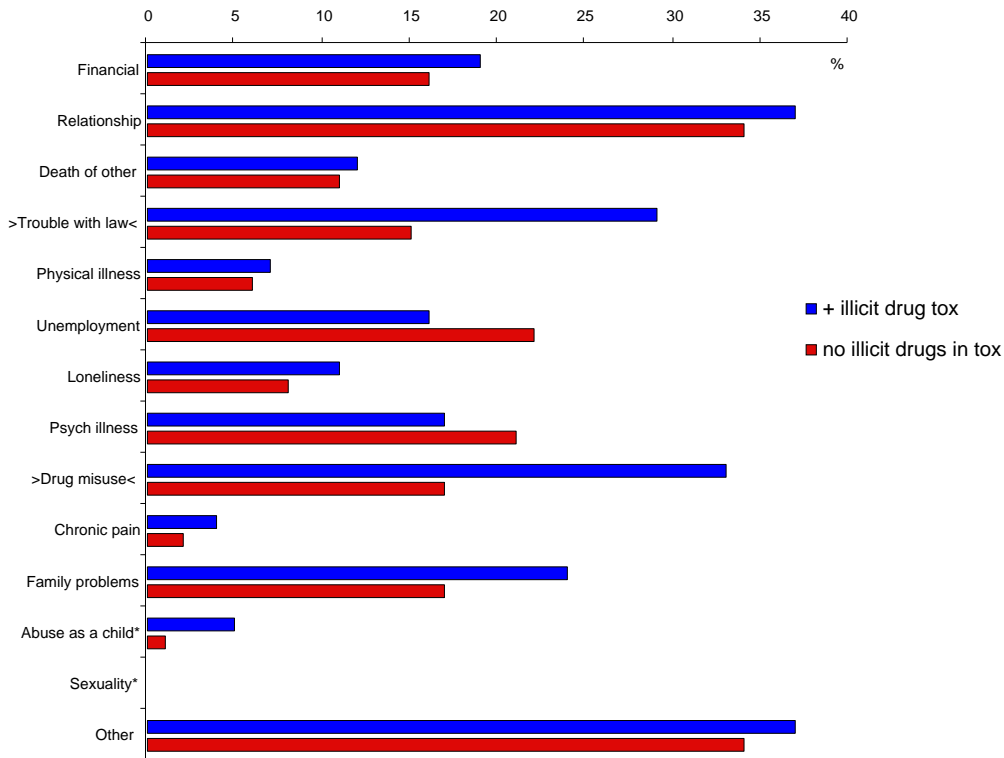
Stressful life events such as unemployment, relationship breakdown, interpersonal conflict and psychiatric illness which were considered to have been precipitating factors for suicide are shown in Figures 5 and 6. These figures compare the percentage of occurrence of each life stress event for those with a positive toxicology analysis for illicit drugs and those without.

For most stressors there was little difference in the proportion of instances with or without illicit drugs detected in the post-mortem toxicology analysis. Not surprisingly, those males who were described as having drug use as a stressor were more likely to have illicit drugs detected in their post-mortem toxicology analysis, $\chi^2 (1, N=490) = 16.262, p < .05$. This was also evident for females but due to the small numbers involved did not reach significance.

Male suicides who had 'trouble with the law' as a stressor were also significantly more likely to have illicit drugs detected in their post-mortem toxicology analysis, $\chi^2 (1, N=490) = 11.937, p < .05$. Although just out of the range of significance, males who had family problems as a stressor were actually less likely to have illicit drugs in their post-mortem toxicology analysis.

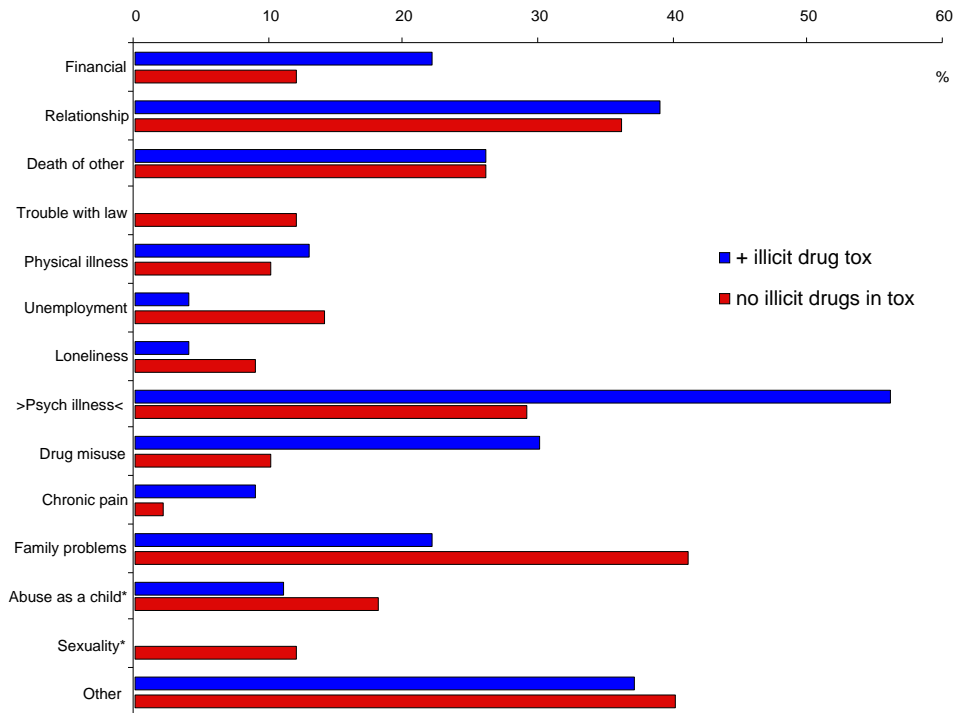
Females having psychiatric illness as a life stress event were also more likely to have illicit drugs detected in their post-mortem toxicology analysis, $\chi^2 (1, N=81) = 5.229, p < .05$.

Figure 5: Illicit drugs detected in post-mortem toxicology, by stressor, males 15-24 yrs



Note: Stressors surrounded by > < are significant at the .05 level.
 * Data only recorded from 1996.

Figure 6: Illicit drugs detected in post-mortem toxicology, by stressor, females 15-24 yrs



Note: Stressors surrounded by > < are significant at the .05 level.
 * Data only recorded from 1996.

4.9 Alcohol

Alcohol was the most common drug found in the post-mortem blood results of young people in this study with 44% of young males and 36% of young females having positive toxicology results for alcohol. Seventy percent of young people with alcohol in their toxicology results had blood alcohol levels above the WA legal driving limit of .05 (see Table 9). Speculation regarding the role of alcohol in suicide has noted the drug’s depressive effect, it’s ability to impair judgement and decision making, exacerbate stressful life events and reduce inhibitions (Murphy, 1986; National Health Service (UK), 1999; Norstroem, 1995; Trammel, Kurpius, & Metha, 1998). Alcohol is often consumed just prior to suicide in order to disinhibit and overcome the fear of death and other constraints to suicide (Hirschfeld & Davidson, 1988; Murphy, 1988).

Table 9: Post-mortem blood alcohol levels, by gender and age (15-24yrs)

BAL	Males		Females	
	n	%	n	%
0.000	275	56.0	52	64.0
0.001-.049	39	8.0	8	10.0
0.050-.150	103	21.0	12	15.0
0.151+	73	15.0	9	11.0
Total	490	100.0	81	100.0

Note: The WA legal BAL limit is .05%.
Included in the 0.000 category is any case where a test was not conducted.

4.10 Polydrug involvement

Often a drug was not present in isolation. The presence of alcohol, prescription and over the counter drugs were commonly detected in the toxicology results of one person. While licit drugs such as prescription and over the counter drugs have not been analysed in this report, the influence of ingesting a number of different drugs on decision making, inhibitions and judgement can not be ignored. Forty one percent of male and 38% of female suicides had a combination of two or more drugs present in their toxicology analysis (this includes alcohol, illicit or licit drugs).

While the most common drug detected was alcohol, a quarter of the males (25.1%) and a third of the females (34.5%) with alcohol in their toxicology results also had illicit drugs detected (see Table 10). The question of whether alcohol intoxication at the time of suicide (i.e. BAL > .05) was associated with illicit drug use detected by post-mortem blood toxicology was investigated by means of logistic regression analysis. The derived model only approached significance ($p=0.74$) but nevertheless pointed to alcohol intoxication being around 1.4 times (CI = 0.97 – 2.1) more likely among those with illicit drug(s) being present at the time of death. This highlights the complex nature of drug use and multiple drug use among youth completing suicide and the need for other sources of comparative data to determine the extent and interaction of such factors in increasing the risks of suicide.

Table 10: Illicit drugs in post-mortem toxicology, by blood alcohol level and gender

BAL	Males				Females			
	No illicit drugs in toxicology		Illicit drugs in toxicology		No illicit drugs in toxicology		Illicit drugs in toxicology	
	n	%	n	%	n	%	n	%
.000	182	(53.1%)	93	(63.3%)	39	(67.2%)	13	(56.5%)
.001-.049	27	(7.9%)	12	(8.2%)	5	(8.6%)	3	(13.1%)
.050-.150	80	(23.3%)	23	(15.6%)	7	(12.1%)	5	(21.7%)
.151+	54	(15.7%)	19	(12.9%)	7	(12.1%)	2	(8.7%)
Total	343	(100%)	147	100%	58	100%	23	100%

Note: The WA legal BAL limit is .05%.
Included in the 0.000 category is any case where a test was not conducted.

4.11 Fatal use of alcohol or illicit drugs in deaths by suicide

The use of alcohol or illicit drugs as the main instrument for a death by suicide was rare. Less than 2% (11 cases out of 571) had lethal levels of these drugs detected in their post-mortem toxicology analysis in the entire 13-year period. However, in the majority of these cases the primary cause of death was found to be attributable to other causes.

Nine young males had lethal levels of illicit drugs in their toxicology results, seven of which were opiates and two inhalants. However, in only two of these cases was the illicit drug considered to be main cause of death. The other main causes of death were hanging, jumping from or in front of an object, and overdose from other drugs. Two females also had lethal levels of opiates in their toxicology. In one instance this was the cause of death and in the other death was due to an external means.

4.12 Summary

What is the prevalence of alcohol and illicit drug use in the WA youth population who suicide?

Forty four percent of males and 36% of females had alcohol in their post-mortem toxicology analysis. Nearly a third of young males and over a quarter of young females had illicit drugs present in their post-mortem toxicology analysis.

Which illicit drugs were most commonly associated with suicide?

The illicit substances most commonly detected at post-mortem were cannabis (20% of males and 11% of females), stimulants (9% of males and 8% of females), and opiates (7% of males and 12% of females). Young people with a known history of drug use were significantly more likely to have illicit drugs detected at post mortem.

Were these drugs used in isolation?

Where drugs were detected at post-mortem they were usually found in combination. Forty one percent of males and 38% of females had two or more drugs present in their toxicology analysis (this included alcohol, licit and /or illicit drugs). A quarter of males and a third of females who had alcohol in their system also had illicit drugs detected but the association between any level of alcohol ingestion and illicit drug use was not statistically significant. However, where the blood alcohol level reached the point of intoxication (BAL >.05%) there was a significantly increased (1.4 times) likelihood that illicit drug(s) were also present.

How often were these drugs the main cause of death?

Rarely were alcohol or illicit drugs the main cause of death. Only three individuals used illicit drugs to intentionally take their own lives. Eight others had fatal levels of either alcohol or illicit drugs detected, however used other external means to complete suicide.

What other factors may contribute to an increased use of alcohol or illicit drugs in this population?

Young people who had a history of substance use were significantly more likely to have had illicit drugs present in their post-mortem toxicology analysis while young females who were unemployed were significantly less likely to have illicit drugs detected. Both young males and females with a diagnosed depressive disorder were more likely to have illicit drugs present in their toxicology analysis than those with a diagnosed schizophrenic disorder. Young males who had the precipitating life event of having been in trouble with the law were significantly more likely to have illicit drugs detected, as were young females with a psychiatric illness as a precipitating event. Fewer Aboriginal males had illicit drugs detected compared to their non-Aboriginal counterparts.

5. Review of current preventative programs

Given the serious consequences of harmful drug use in adolescence and the early adult years, considerable effort has been directed towards identifying effective treatment. Until quite recently, applied research in the substance use field has consisted primarily of experimental trials of various forms of treatment for alcohol and other drug use with the aim of increasing the effectiveness of treatment and to prevent relapse following treatment.

Many of these studies have demonstrated how abstinence can be achieved or harmful patterns of substance use can be reduced. However the long-term maintenance of abstinence and/or controlled drug use are difficult to achieve as the reinforcing properties of alcohol and other drugs are themselves often reinforced by norms and behaviours of family members and others in the community (Hawkins, Catalano, & Miller, 1992). Over and above the poor longer-term outcomes of drug treatment is a growing concern about the high cost of treatment and of the inability of existing treatment programs to keep pace with increasing demand (HDWA Mental Health Division, 1999). These considerations have stimulated interest in prevention strategies and interventions which seek to modify the risks for drug use and adverse outcomes associated with harmful patterns of use.

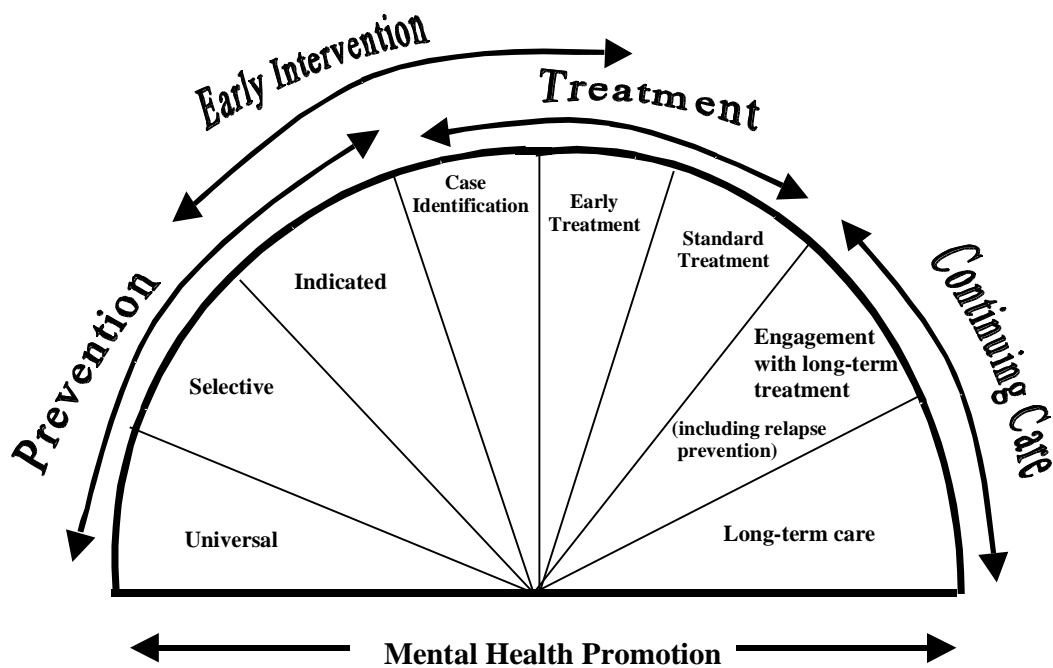
5.1 Evidence based prevention

Seminal reviews conducted in Australia and the USA in the mid 1990's conclude that prevention strategies which target risk factors for disorder are efficacious in reducing the prevalence of several psychosocial problems of concern to the community including teenage drug use, depression and suicide (Mrazek, 1994; Raphael, 1993). Traditionally, the public health model of prevention is based on identifying the proximal (direct) and distal (indirect) risks at various points in a person's development which may predispose to an increased likelihood of a particular disorder occurring. Opportunities for prevention can thus be targeted at critical points with the aim of reducing risk by interrupting the risk factor(s) within the individual and/or his/her environment before disorder or adverse outcomes occur.

Until the mid 1990's preventive interventions have been categorised as primary, secondary or tertiary prevention depending on how early or late in the course of a problem's development the intervention is implemented. *Primary prevention* refers to activities which seek to reduce risks and prevent the occurrence of new cases of disorder (i.e. incidence reduction); *Secondary prevention* involves those interventions which occur after early symptoms of disorder have developed and thus may reduce the total number of new and old cases (i.e. prevalence reduction), and; *Tertiary prevention* includes clinical treatment and rehabilitation efforts to reduce the sequelae and complications arising from the problem/disorder once it is manifested (Silburn, 1999).

The US Institute of Medicine's (IOM) 1994 report on prevention in the mental Health field has proposed a complementary categorisation based on the level of risk of disorder in various groups targeted, and thus the actual scope of the intervention (Mrazek, 1994). Within the IOM model, *universal interventions* target whole populations at average risk, *selected interventions* target groups at increased average risk, and *indicated interventions* target those individuals at highest risk for disorder. This model is summarised in the semicircular diagram shown in Figure 7.

Figure 7: The spectrum of interventions for mental health problems and mental disorders



Over the past few years the IOM classification of prevention has gained increased currency for the targeting, implementation and evaluation of prevention initiatives within and beyond medical settings. One of its main benefits has been to increase recognition among health and mental health practitioners of the need for the development of prevention services as a legitimate and essential component of the overall continuum of care. Another advantage of the model stems from its theoretical base in epidemiology and what it offers through the development of a population perspective and methodologies of risk management.

For example, knowing something about the magnitude of various risks for a condition (*relative risk*), and having a knowledge of the proportion of the population exposed to or affected by each of these risks (*risk prevalence*) it is then possible to select and target prevention strategies based on theoretical estimates of the potential reduction of disorder (*preventable fraction*⁵) and the number of individuals who need to be targeted to prevent one case (*the number needed to treat*⁶). Through the application of such principles this model has enabled more accurate and cost-effective targeting and evaluation of prevention (Silburn, 1999).

The co-occurrence of substance use and other problems such as mental health disorders and suicide has important implications for treatment and prevention. Most studies to date have focused on small subsets of identifiable risk factors for drug abuse. However, many risk factors for youth substance use

⁵ The term *preventable fraction* is sometimes used interchangeably with the term population attributable risk (PAR). It can be interpreted as the proportion of exposed cases for whom the outcome (suicide or suicidal behaviour) is attributable to a particular risk factor. For a case-control study, the PAR % is calculated by $PAR = p \times (OR - 1) / p \times (OR - 1) + 1$ where p is the exposure prevalence in the population and OR is the odds ratio of the risk factor. Rothman, K. J. (1986). *Modern Epidemiology*. Boston, USA: Little, Brown and Co..

⁶ The *number need to treat* is the inverse of the rate difference between intervention and controls in randomised trials of an intervention. It provides an indication of what the maximal effect of an intervention targeting that risk factor may be in reducing risk for a particular outcome (e.g. suicidal behaviour) in that population. Rothman, K. J. (1986). *Modern Epidemiology*. Boston, USA: Little, Brown and Co..

also predict other adolescent problems. For example, adolescent drug use is strongly correlated with delinquency, teenage pregnancy, school behaviour and early school leaving (Hawkins, Jenson, Catalano, & Lishner, 1988).

The number of risk and protective factors a young person is exposed to is also predictive of a range of other problem behaviours and/or adverse social outcomes. For example the Victorian Adolescent Health Survey demonstrated that as the number of risk factors increases there is an incremental rise in the prevalence of alcohol use, cannabis use, sexual activity, deliberate self-harm and physical violence. Conversely, as the number of protective factors increases the probability of these adverse outcomes decreases (Victorian Department of Human Services, 2000).⁷

As some risk factors for drug abuse may be resistant or impossible to change, research on protective factors which mediate or moderate exposure to risk is also critically important for prevention (Cowen & Work, 1988; Garmezzy, 1991; Garmezzy, 1993; Rutter, 1985). To the extent that protective factors are identified that inhibit drug use among those at risk, strategies can seek to address risk by enhancing these protective factors. Research with groups exposed to multiple risks has identified substantial sub-groups of individuals who are able to negotiate risk exposure successfully, escaping relatively unscathed (Werner & Smith, 1982).

For the concept of protective factors to be useful, it must apply to differences in outcomes among different individuals exposed to the same risks. Rutter (1985) has described interactive processes, which occur at different stages of child and adolescent development and identified multiplicative interactions or synergistic effects of such protective factors points to the value of prevention strategies which are broadly targeted and incorporate multi-component interventions, which seek both to reduce the number of risks and promote the availability of protective factors to build resilience.

The key to effective prevention is an accurate knowledge of which risk factors, or combinations of risk factors, are most salient, which are modifiable, and which are specific to the particular problem of concern rather than generic. Table 11 provides an overview of some of the main risk and protective factors for drug use completed suicide among youth aged 15-24 years.

Despite the obvious need for a greater emphasis on prevention in the area of drug use and suicide, the availability of suitable programs based on modern prevention science has been hampered by the fact that the relevant risk and protective factors and processes is at a very early stage of development. Accumulating recent evidence, particularly from large scale population studies, is now improving the prospects for the selection and targeting of key causal factors and populations. Whilst not definitive, the available evidence is nevertheless sufficient to indicate the general direction and best avenues for systematic prevention to proceed.

Table 11 highlights the extent of the overlap of risk factors for drug use and suicide. The shared risk settings and process for these and a number of other adverse youth outcomes has provided the rationale for broadly targeted approaches which seek to address the contextual, individual and interpersonal risk factors influencing the development of young people. There is good evidence from a number of randomised control trials with long term follow-up (15 – 20 years) demonstrating the efficacy and cost effectiveness of such interventions.

These multi-component interventions simultaneously target community, family and school risk settings as well as providing evidence based life-skills training curricula and opportunities for

⁷ In the Victorian Adolescent Health Survey the three most prevalent risk factors identified by young people were: a) poor family discipline (e.g. would not get caught if wagged school, or drank without permission); b) family conflict (e.g. people in my family often insult and yell at each other); and, c) availability of drugs in the community (e.g. easy to get cigarettes, marijuana, heroin). The three most prevalent protective factors were: a) opportunities for positive community involvement (e.g. sports teams for people their age, youth groups are available); b) rewards for positive involvement in the family (e.g. enjoy spending time with parents, parents notice when doing something well); and, c) belief in moral values (e.g. it is not OK to cheat, it is important to be honest) Victorian Department of Human Services (2000). *Improving the lives of young Victorians in our community*. Victorian Government, DHS..

developmentally appropriate skill acquisition and recognition (Botvin, Griffin, Diaz, Scheier, & Epstein, 2000). Programs found to be most effective are those which focus on addressing risk and protective factors at appropriate developmental stages; those which intervene early, before the behaviour stabilises; those which reach and include individuals at high levels of risk, which address multiple risks with multiple strategies, and; those which also address the racial, cultural and economic diversity of communities (Hawkins et al., 1992).

It can also be seen in Table 11 that potentially modifiable risk and protective factors exist at the individual level as well as within the proximal settings of the home, school and local neighbourhood and in the more distal settings of broader society, economics and culture. Clinical approaches to prevention have tended to focus their efforts on assisting individuals to modify their behaviour through information, skill development and attitudinal change. By contrast, more socially focused interventions have sought to modify some of the broader structural influences, which operate less directly on whole populations. Between these extremes are other approaches which seek to reduce the risk exposures of young people in their most proximal risk settings of home, family, peer group and school. Opportunities for intervention thus exist at the indicated, selected and universal levels of prevention.

Table 11: Risk and protective factors for drug use and completed suicide in young people

Risk Factors	Drug Use	Suicide	Protective factors	Drug use	Suicide
<i>Environmental factors</i>					
Easy access to means	•	•	Prevailing anti-drug norms	•	
Socio economic disadvantage	•	•	Cultural/religious injunctions against suicide		•
High socio economic advantage		•	Low availability of drugs	•	•
Rural Location		•	Higher legal drinking age (21 vs 18 years)	•	•
Urban location	•				
<i>Family & Social Factors</i>					
Family discord and dysfunction	•	•	Family cohesion, attachment and bonding	•	•
Poor/inconsistent parental supervision/discipline	•		Parental monitoring, clear boundaries	•	
Low family attachment and bonding	•	•	Availability of caring adults, positive role models		•
Family history of psychiatric illness		•	Positive bonds with peers	•	•
Family history of alcohol and other drug use	•		Positive connection to school	•	•
Family/peer attitudes favourable to drug use	•		Social supports outside the family	•	•
Negative peer associations, peer rejection	•	•	Opportunities for positive community involvement	•	•
<i>Individual factors</i>					
Male gender	•	•	Sound problem solving skills	•	•
Aboriginality		•	Sound decision making skills	•	•
Substance use		•	Positive sense of self and well being		•
Emotional distress	•	•	Good social skills/perceived social competency		•
Interpersonal conflict	•	•	Adaptive coping skills/resiliency		•
Co-existing psychiatric disorders	•	•	Achievement orientation & academic success	•	
Early and persistent behaviour problems	•				
Anti-social behaviour	•	•			
Social isolation and alienation		•			
<i>Life events</i>					
Past trauma eg. abuse	•	•	New opportunities and turning points	•	•
Relationship breakdown	•	•			
Academic/career failure, or perception of	•				
Death or significant loss of another	•	•			
Previous suicide attempts		•			

6. Options for reducing the incidence of suicide

There is a comparatively long history of preventive intervention targeting alcohol and other substance use in adolescent and older youth populations. School-based drug prevention programs, based on the provision of information, were first trialed in the 1960's but had generally negative outcomes. More recently, several programs at all levels (i.e. universal, selected and indicated) which are more broadly based and particularly those which involve multi-component interventions addressing a range of social factors (e.g. peer and adult role models, media and community influences) as well as individual skills development have been shown to be effective in reducing harmful drug use among youth (Tobler, 1997). Table 12 below summarises the range of preventive programs implemented in Australia and/or overseas which include amongst their aims the prevention of substance use and/or suicidal behaviours or which specifically target risk and protective factors common to both. Most of the programs included within this table have been evaluated.⁸

6.1 Universal interventions

Health promotion and prevention activities for which there is good evidence of effectiveness include community mobilization and parent training. Community mobilisation approaches can potentially modify risk and protective factors across different socialisation environments, including schools, families, community, media and peers. For example 'Project Northland' used a multi-level, community wide approach, including school curriculum, homework activities, peer delivered materials, community activities and new laws for the sale of alcohol (Perry, 1996). Findings indicated that this community level intervention program successfully influences a range of risk and protective factors, and behavioural outcomes including depression. The 'Midwest Prevention Program' similarly combined a school drug education program with a wider community mobilisation program (MacKinnon, Conroy, Emans, & Woods, 1993). It demonstrated positive impacts in varying degrees of mediating factors on the use of tobacco, alcohol and cannabis.

One of the most widely implemented multi-strategic and comprehensive prevention approaches targeting youth is the "Communities that Care" (CTC) approach. This approach is designed to address a range of problematic adolescent behaviours including drug use, depression and suicide. Variations of the CTC approach have now been implemented in several hundred communities in the USA, the UK, the Netherlands and just recently in Australia (Victoria) (Toumbourou & Gregg, 1999). The CTC approach acknowledges the broader ecological context of an individual's social development and the reciprocal relationship between young people and their environments (Magnusson, 1995).

Commencing with a systematic, school-based survey of the risk and protective factors within individual youth and their main spheres of environmental influence (ie family, school and local community), this approach involves the selection and implementation set of interventions targeting risk and protective factors in each of these different environments. The CTC model also provides a framework for selecting appropriate and efficacious (evidence based) interventions to match the specific risk profile of the community (Hawkins & Catalano, 1992). The CTC approach is thus characterised by its authors as a 'community development and prevention operating system' rather than a program. A key feature of CTC is the flexibility with which it can be adapted to local needs and the way in which it is designed to empower and support communities developing and maintaining their own infrastructure and resources for on-going prevention.

⁸ A more detailed description of the programs and the risk/protective factors targeted is provided in Appendix E.

Table 12 Preventative programs that address the risk and protective factors underlying drug use and suicide

Name of Program	Country of Origin	Drug Use Component	Suicide Prevention Component	Other Component/s	Reducing Risk Factors	Enhancing Protective Factors	School Based Component	And Multi-Level Strategies	Evaluated ✓ ⊕
Level of intervention: Universal									
Midwestern Prevention Project/Project Star – School based program from grade 7 to high school. Incorporates school-based program, mass media, parent program, community organisations.	USA	•			•	•	•	•	✓
Project Northland – School based in year 6, 7 & 8, peer leadership, parental component, community task forces.	USA	•			•	•	•	•	✓
The Woodrock Youth Development Project – Emphasises social competence training and life-skills improvement. Also targets families.	USA	•			•	•	•	•	✓
The Life-Skills Training (LST) Program –To enhance the development of basic life-skills, personal competence, and skill development.	USA	•		•	•	•	•	•	✓
Adolescent Alcohol Prevention Trial (AAPT) – Substance abuse prevention curriculum	USA	•			•	•	•		✓ ⊕
Communities That Care – An operating system that aims to mobilise communities to promote attachment, healthy youth development and problem prevention.	USA			•	•	•		•	✓
Community/School Policies – Policy based changes targeting the effect of policies such as drug availability, taxation and responsible service on use reduction.	USA	•			•		•	•	
Problem Solving for Life Project – Targets problem solving skills and unhelpful thinking in order to reduce the occurrence of depression. Year 8 students targeted.	AUS			•			•		⊕
Reach Out–Web site for young people. Aims to reduce self-harm/suicide & to promote social change.	AUS		•		•	•		•	✓ ⊕
Living With Teenagers – A parenting groups program which aims to build family strengths by promoting parenting skills, confidence, coping strategies and providing support.	AUS			•	•	•			✓ ⊕
Mental Health Promotion – Education program for parents, workers and the community	AUS		•	•	•	•	•	•	⊕
Drug Education – Aims to educate the general public re: drug use	AUS	•			•	•			
Make a noise – Web based program that aims to inform young people on health issues and to enhance coping strategies.	AUS	•	•		•	•			
School Drug Education project – Curriculum based drug awareness and education project aimed at primary and high school aged kids.	AUS	•			•		•	•	
Youth Suicide Prevention – A parents guide manual (education and information) distributed through the Scout Association	AUS		•		•	•			

Name of Program	Country of Origin	Drug Use Component	Suicide Prevention Component	Other Component/s	Reducing Risk Factors	Enhancing Protective Factors	School Based Component	And Multi-Level Strategies	Evaluated ✓ ⊕
Gatekeeper Training – A WA program aimed at training professionals on suicide prevention, identification and referral strategies. Set in the schools and other settings that work with young people	AUS		•		•	•		•	✓
Preparing for the Drug Free Years (PDFY) – Research based program for kid’s 9-14 years and their families. To strengthen family bonds, reduce family conflict and to involve children in meaningful ways with their families.	USA	•		•	•	•			✓
Live the Future – Aims to provide a model of best practice dissemination of health information through libraries, specifically relating to alcohol and other drug use.	AUS	•		•	•	•		•	✓
The Positive Parenting Program (PPP) – Program aimed at positive parenting techniques with young children, aimed at reducing problem behaviours.	AUS			•	•	•		•	✓
Programs for Parents (PFP) – Family based program aimed at enhancing parenting skills and emotional competencies	AUS			•	•	•			⊕
The Samaritans Youth Pack – School based curricular activities for teachers, specifically focused on mental health and suicide prevention	UK		•	•	•		•		⊕
ALERT- Targets 12-13 years olds (has been used in low socio economic areas) regarding social influences on and attitudes to drug use. School based curriculum using teachers and peer lead classes	USA	•			•	•	•		✓
Resilient Kids – School based suicide prevention through use of interactive education on computers	AUS		•		•	•	•		⊕

Note: • = Evaluated, positive changes found,
 ○ = Evaluated, no significant changes found,
 ⊕ = Not yet evaluated

Name of Program	Country of Origin	Drug Use Component	Suicide Prevention Component	Other Component/s	Reducing Risk Factors	Enhancing Protective Factors	School Based Component	And Multi-Level Strategies	Evaluated ✓ ⊕
Level of intervention: Selective									
Resourceful Adolescent Program (RAP) – Identifies year 8 students at risk of depression and provides a program designed to teach skills to provide resistance to depression. Based on Griffith Early Intervention Program.	AUS		•	•	•	•	•		✓
Promoting Optimism WA – Identifies year 7 students at risk of depression and places them in a 12-week program. Based on the Penn Prevention Program	AUS		•	•	•	•	•		✓
Mental Health Early Prevention Service – Identifies and targets at risk youth groups (NESB, drug users, parents with mental illness etc) in a multi service, case management format.	AUS			•	•	•		•	⊕
Project Hahn – At risk youth due to personal, economic or location issues targeted for personal and social development through outdoor adventure and challenge activities. Also uses peer mentoring.	AUS	•	•	•	•	•			⊕
Barnardos – Street work out reach team project aimed at youth at risk of drug use. Aims to educate, work with and refer young people with drug issues.	AUS	•			•				⊕
Personal Growth Class (PGC) – Targets high school students who are potential dropouts. Provides life skills development, anti drug message and peer support components.	USA	•	•	•	•		•		✓
Coping and Support Training Model (CAST) – Program aimed at enhancing social support and skills training for at risk students.	USA	•	•	•	•	•	•		✓
Dare To Be You (DTBY) – Aims to improve self concept, satisfaction and skills with parenting, as well as improving children’s resiliency skills	USA			•	•	•		•	✓
Across Ages (AA) – Substance use prevention targeted at school children aged 10-13 years and their families	USA	•		•	•	•	•	•	✓
Strengthening Families Program – A multifaceted program targeting 6-10 year old children of substance users. Includes work with the both parents and the children	USA	•		•	•	•		•	✓
Focus on Families Program – For children of methadone users. Also has parent training. Targets parenting skills, family management and expectations etc	USA	•		•	•	•		•	✓
The Child Development Project (CDP) – Aiming to increase and enhance the social, behavioural, and academic competence of year 6 students (11-12 years) and their parents,	USA			•	•	•	•	•	✓
Creating Lasting Connections (CLC) – Prevention of drug and alcohol use in 11-15 year olds	USA	•							✓
Greater Alliance of Prevention Systems (GAPS) – Reducing community drug problems for youth at high risk for substance use	USA	•		•		•			✓

Name of Program	Country of Origin	Drug Use Component	Suicide Prevention Component	Other Component/s	Reducing Risk Factors	Enhancing Protective Factors	School Based Component	And Multi-Level Strategies	Evaluated ✓ ⊕
The Residential Student Assistance Program – Targets substance use and mental health problems for institutionalised adolescent children of substance users	USA	•		•	•	•			✓
Youth Program (Onslow) – Substance use prevention in young people in the community of Onslow	AUS		•	•	•		•		⊕
Smart Leaders (SL) – Prevention of substance use for adolescents aged between 13-17 years of age	USA	•			•	•	•		✓
The Family Advocacy Network (FAN Club) – Prevention of substance use in youth aged between 11-13 years	USA	•			•	•			✓
Reconnecting Youth Program – Aims to build resiliency to risk factors associated with substance use in young people at school from 9 th to 12 th grades.	USA	•	•	•	•	•	•		✓
Adolescent Transition Program – The parents of all students in school are taught parenting practices for the prevention of substance use.	USA			•	•	•		•	⊕
Young People and Psychiatric Illness Intervention and Assessment (YPPI-IA) Program – Suicide prevention in people aged between 14 and 20 years.	USA		•		•				⊕

Note: • = Evaluated, positive changes found,
 ○ = Evaluated, no significant changes found,
 ⊕ = Not yet evaluated

Name of Program	Country of Origin	Drug Use Component	Suicide Prevention	Other Component/s	Reducing Risk Factors	Enhancing Protective Factors	School Based Component	And Multi-Level Strategies	Evaluated	✓
Level of intervention: Indicated										
Substance Use and Mental Illness Treatment Team (SUMITT) – A program designed to identify and treat people with the co-existing disorders of mental illness and substance use. Program aims to provide direct clinical services to clients identified with co-existing disorders.	AUS	•	•	•	•				⊕	
Self Harm Social Workers – In the 3 major teaching hospitals to identify and refer young people who present with self harm	AUS		•		•				⊕	
Next Step – Drug use treatment and prevention for 18-24 year old substance users	AUS	•			•				⊕	
Reconnecting Youth Program – year 9-12 students showing sign of multiple risk behaviours. Uses behavioural skills training and social network development.	USA	•	•	•	•	•	•		✓	
LifeSPAN – Aims to reduce suicide risk in young people with mental illness	AUS		•	•	•			•	⊕	
Street Van Outreach Program – Targets high risk young people, homeless, drug users. Offers emotional support and info. Aims for suicide prevention	AUS	•	•		•				⊕	
PACE – A program for parents of adolescents (with/out drug issues) . Aims at improving communication skills and enhancing the connect between parent and child	AUS	•	•	•	•	•			⊕	✓

Note: • = Evaluated, positive changes found,
 ○ = Evaluated, no significant changes found,
 ⊕ = Not yet evaluated

The sources for the table above are reported in Appendix F.

While substance use prevention programs conducted in Australia usually focus on harm reduction, the USA has given more prominence to the prevention of early onset drug use and abstinence (Victorian Department of Human Services, 2000). The US program 'Preparing for the Drug Free Years' (PDFY) has demonstrated effectiveness in increasing the intention of young people to abstain from alcohol and to enhance family bonding (Spoth, Redmond, Hockday, & Yoo, 1996). It is unclear whether programs designed for the abstinence prevention framework of the United States would be culturally appropriate to the Australian context. Nevertheless, a strong component of the PDFY is the enhancement of the parent-adolescent attachment in early adolescence, and the positive effects of improving this attachment are likely to translate into improvements in other health behaviours during adolescence.

Harm reduction is a central feature of the current Australian National Strategic Framework (Ministerial Council on Drug Strategy, 1998). Harm reduction refers to the range of policies and programs designed to improve health, social and economic outcomes for both the community and the individual, and encompasses a wide range of approaches, including supply-reduction strategies designed to disrupt the production and supply of illicit drugs, demand-reduction strategies designed to prevent the uptake of harmful drug use, including abstinence oriented strategies to reduce drug use and, harm-reduction through targeted strategies designed to reduce drug-related harm for individuals and communities.

In WA, school based drug education is an important part of this approach, and has demonstrated evidence of dissemination and cost effectiveness (Curtin University of Technology, 2000; Victorian Department of Human Services, 2000). The strategic plan for school drug education is a four-year plan that aims to ensure that effective drug education is available in all Western Australian schools. This includes drug education curriculum materials in the context of health education that provide direction and support to teachers. It also includes a whole of school approach to schools developing policies and guidelines for drug education and the management of drug issues in schools and the involvement of parents and local communities in the implementation of procedures and programs (School Drug Education Project, 1998a; School Drug Education Project, 1998b). Australian programs which warrant more extensive evaluation include 'Primary Steps' (targeted at primary school students) and various programs targeted at adolescents, including 'Rethinking Drinking' and 'Next Steps' (which address alcohol and illicit drug use respectively).

Several programs in the United States, the United Kingdom and Australia have used school based health education as a strategy for addressing alcohol and other drug issues (NSW Department of Health, NSW Department of School Education, Catholic Education Commission & Association of Independent Schools, 1996; World Health Organisation (WHO), 1994). In Western Australia this is now an integral part of the Health Education curriculum but is still not universally available to all students. School based health education approaches targeting drug use appear to have had mixed results, with some programs reporting degrees of success and others reporting minimal impact. Evaluations have indicated that program effectiveness can reflect the quality of implementation, program length and content, and the age at which the youth receive the programs (Victorian Department of Human Services, 2000).

A large scale randomised control study of junior high school students in the USA found that students who received a broad spectrum, cognitive behavioural, universal life skills program reported less use of illicit drugs than those who did not at follow up five and a half years later. The results also showed the importance of targeting gateway drugs such as alcohol and tobacco in order to prevent illicit drug use (Botvin et al., 2000). This study concluded that such programs need to be comprehensive in targeting many risk and protective factors, and must ensure a 'sufficient dose' (eg. a strong initial implementation of 12-15 class periods) and include follow up sessions in order to be most effective.

An integral component of these and other programs is the targeting of peer, family and societal attitudes favourable towards drug use. Other programs that include such a component are 'Make a Noise' (Aust) a web based program delivered to young people; the 'Adolescent Alcohol Prevention Trial (AAPT) program, (USA) which uses a normative education approach to establish conventional norms regarding alcohol use and resistance skills training to build resistance to peer and other forms of

pressure; and 'Project Northland' (USA) which also addresses social attitudes towards drug use amongst peers and families, community laws and norms, and encourages healthy beliefs and clear standards among young people.

An interesting option recently proposed for preventing suicide among US youth is to raise the legal drinking age in all States to 21 years. This proposal is based on epidemiological analysis of the rates of harmful alcohol consumption and suicide between States where young people are permitted to consume alcohol at either age 18 or 21 years. This same analysis provides evidence that, if implemented, this measure could achieve an average 8% reduction of suicide within those States that increase their legal drinking age to 21 years (Birckmayer & Hemenway, 1999). While such a measure is unlikely to find community or political support in Australia, it nevertheless highlights the importance of the need to find effective ways of reducing demand for and access to harmful levels of alcohol consumption by young people.

6.2 Selected interventions

Programs which identify and target groups of young people at higher risk for suicidal behaviour and drug use include those which are directed at children of drug users, young people identified as at risk of mental health problems and/or with a history of conflict in the family. The 'Strengthening Families Program' targets 6-10 year old children of substance users with a 14-week program aimed at reducing family conflict and substance use and improve family communication. It involves sessions with both children and the parents, first separately and then in combined groups. The 'Resourceful Adolescent Program' (RAP) (Australia) is a 10-hour classroom based intervention implemented over 5 or 10 weeks which teaches explicit skills to improve resilience to depression in groups of 12-13 years old identified as being at risk for depression, low school achievement and dropout, teenage drug use, depression and suicide risk. The 'Promoting Optimism WA' an Australian adaptation of the Penn Optimism Program (Jaycox, Reivich, Gillham, & Seligman, 1994) has shown some promise in improving the later adolescent outcomes of year 7 students initially identified as being at risk for depression (Roberts, Bishop, & Fenton, 2000).

The 'Coping and Support Training Model' (CAST) is one of the few evaluated selective programs which specifically aims to decrease suicidal behaviours, depression, drug involvement and to increase school performance. This school-based program targets very high-risk students and involves 12 two-hour group sessions. It includes manualised modules for orientation, group support, self-esteem, decision making, anger management, learning strategies, drug use control and 'staying on track' (relapse prevention strategies). The 'Personal Growth Class' (PGC) program is another promising US program which targets groups of 'at risk' youth. It is a comprehensive program addressing low self-esteem and lack of personal control while attempting to improve communication and interpersonal skills. The 'Across Ages' (AA) program also run in the USA aims to reduce substance use amongst 10-13 year olds by addressing this group and their families. This program involves mentoring, community work, problem solving and resistance skill development and parental involvement. It particularly attempts to address an unsupportive home environment, truancy and poor academic performance.

6.3 Indicated interventions

An Australian program that has adopted a parent training strategy for parents with concerns about their adolescents' drug use is the "Parenting Adolescents: A Creative Experience" (PACE) program (Toumbourou & Gregg, 1999). This program incorporates facilitated groups that operate on adult learning principles. The groups include modules relevant to adolescent communication, conflict resolution and adolescent development (Jenkin & Bretherton, 1994). The early outcomes of this program have been positive although the extent to which these will translate into long term reductions in youth substance use and suicidal behaviour will require longer-term follow-up.

One of the major issues with intervening and attempting to prevent the likelihood of further disorder in this area is the complex nature of co-existing disorders. The clinical management of youth with both

substance use and psychiatric conditions present specific challenges. Young people with such problems are frequently from 'hard to engage' populations such as those who are homeless, involved in criminal activities or no longer in the school environment. Such individuals are more likely to drop out of treatment, group prevention programs and have increased risk for relapsing (Crome, 1999a). Most youth treatment agencies and services tend to be set up to deal specifically with one issue or problem and do not have the facilities or expertise to manage people who present with co-existing disorders. This not infrequently results in such youth being ineligible to meet agency criteria for the treatment for either disorder. Relatively little research has been conducted in this area of treatment which compounds the difficulties for people with co-existing disorders accessing treatment appropriate to their needs (Crome, 1999b). There is clearly a need for substance abuse and mental health treatment services to address the underlying risk and protective factors common to both disorders. This requires improved pre- and in- service training and resourcing of clinical staff and access to the relevant specialist services where required as part of a comprehensive care plan.

Given the often co-existing prevalence of mental illness, substance use and suicidal behaviour, programs are needed that targets individuals or groups with one or more of these disorders. The LifeSPAN program in Victoria is one such program, which targets suicide risk amongst those with a mental health disorder. It aims to assist young people in overcoming the barriers often faced when accessing services appropriate to their needs. It also offers skills development in areas such as problem solving, stress management and improved interpersonal skills.

Another Victorian program 'Substance Use and Mental Health Treatment Team' identifies and addresses the needs of young and older people with co-existing mental illness and substance use. This program aims to provide direct intervention with those who require the services of both mental health and drug and alcohol agencies. It also aims to work on a broader scale by developing and testing new, integrated service provision models which address co-existing disorders. Within Western Australia the newly established 'Next Step' youth drug prevention and treatment program is currently evaluating the efficacy of a similar, comprehensive program of care for young people aged 18-24 years which includes active provision for those with co-existing problems of depression, suicidal ideation and substance abuse.

6.4 The current status of prevention research

This review indicates that there is now a wide range of evidence-based programs of universal, selected and indicated prevention which are effective in targeting risk factors for both substance abuse and suicide and reducing substance use and a range of other youth risk behaviours. However, very few of the published intervention studies have included suicide and suicidal behaviours among the outcomes reported. So while there appears to be significant potential for reducing suicide and suicidal behaviour through programs which reduce risk factors for harmful alcohol and drug use, the evidence demonstrating this has yet to be established.

The weight of evidence reviewed in this report highlights the fact that reducing the population prevalence of harmful levels of substance use among young people, suicidal behaviour and other adverse youth risk behaviours will require a much greater emphasis on the universal and selective levels of prevention. Determining the optimum mix of indicated, selected and universal programs of prevention should be a key priority for policy, planning and resource allocation. However, there are a number of data requirements which need to be developed further to enable properly informed judgements being made about what program mix will yield the best return for prevention dollars spent to reduce the overall burden of these associated problems.

Until these data requirements are met, Offord, Kramer, Kazdin, Jensen, & Harrington, (1998) suggests that the most effective strategy is to: Firstly, ensure that effective universal programs are in place. Secondly, targeted programs of varying levels should follow for those not helped sufficiently by the universal programs with more intensive (and costly) programs being implemented for the smaller

number of individuals screened to be at higher levels of risk. Thirdly, for those unaffected by targeted programs, clinical services should be available (Offord et al., 1998).⁹

The advantage of this strategy is that it acknowledges the need to reduce the size of the population seeking clinical services. It also capitalises on the fact that there are likely to be multiplier effects between the different levels of prevention (eg. targeted approaches might work better for high-risk youth if the environment is facilitating due to a universal program also being in place). In addition it makes it clear that no single prevention program or clinical service can be expected to reduce the frequency and burden of these disorders at the population level. The systematic implementation of such a comprehensive strategy will require ongoing population monitoring of the prevalence of drug use, mental health problems and suicidal behaviour as well as the prevalences of their key causal risk factors. In addition to the monitoring of trends, this type of monitoring can provide an early indication of the effectiveness of the preventive measures being implemented (Offord et al., 1998).

⁹ The kinds of information required for this sort of analysis includes reviewing what is known about modifiable risk factors that singly or in combination are causal for the disorder and whether there are prevention programs which are available, with what cost per subject and with what probability of successfully preventing the disorder. Data are also required on the extent to interventions they can be delivered to reach those who need them; their likely rate of use and the proportion of participants who adhere to them once delivered; and the cost of the implementing the interventions. Estimates are also needed of the per annum prevalence of the disorder in the absence of any prevention and the per annum cost to a person with the disorder Offord, D. R., Kramer, H. C., Kazdin, A. E., Jensen, P. S., & Harrington, R. (1998). Lowering the burden of suffering from child psychiatric disorder: Trade-offs among clinical, targeted and universal interventions. *Journal of the American Academy of Child and Adolescent Psychiatry*, 37(7), 686-694.

7. Recommendations

7.1 Recommendations for universal prevention

Recommendation 1

Broadly based universal strategies and programs of prevention to promote youth resilience are required to complement the existing policy framework of the Western Australian Strategy Against Drug Abuse which embraces demand reduction, supply reduction and harm reduction strategies but gives primary emphasis to the prevention and reduction of drug abuse.

The evidence reviewed in this report highlights the effectiveness of more broadly based universal strategies and programs of prevention and the promotion of resilience. Such strategies complement the existing ‘harm reduction’ focus of the State and National Drug Strategies. Those programs for which there is strongest evidence of effectiveness are those which involve community mobilisation, those which target a range of adolescent risk behaviours (including drug use, depression and suicidal behaviour) and those which employ multi-component interventions addressing a range of individual and environmental risk and protective factors (eg. family, school, peer and adult role models, media and community influences) as well as individual life-skills development.

Recommendation 2

The effective implementation of population level preventive interventions will require strengthening the links between clinical, prevention and promotion services across government and non-government agencies, the tertiary education sector and community organisations. Such links are required to ensure community and professional understanding and support as well as to develop the prevention infrastructure needed to support the on-going implementation and evaluation of population based prevention.

The evidence supporting the value of such programs in promoting the social development and resilience of young people and in reducing the individual, social and economic costs associated with harmful drug use is now at a point where planning for their widespread availability within Western Australia should be commenced. This will require the active support of other Departments such as Health, Education, Justice and Family and Children’s Services.

Recommendation 3

The effective implementation of evidence based, population level interventions will require investment in appropriate training and program delivery resources. This prevention infrastructure could be developed through re-positioning of existing treatment and prevention services but will also require the identification of new funding opportunities. Such opportunities could include jointly commissioned initiatives which address the shared risks for a range of adolescent outcomes of concern such as drug use, suicide, early school leaving and crime.

The systematic implementation of population level prevention will require existing Health, Mental Health and Drug Misuse treatment services to allocate a greater proportion of their resources to the development of prevention skills and programs and the establishment of strategic partnerships with other agencies, providers and the tertiary education sector. Given the range of evidence-based models and programs currently available, it is important that large-scale demonstration programs tailored to local requirements are now funded and properly evaluated to guide their wider implementation if effective. The shared benefits of such programs in reducing drug-related harm and preventing suicide highlights the value of jointly commissioned and funded projects which cross traditional portfolio boundaries.

Recommendation 4

Health messages regarding the association between harmful levels of drug use and increased risks for suicide need to be made available to young people, their parents and the community at large.

The increased risk for suicide associated with both alcohol and cannabis use together with their high prevalence of use in the general population suggests that an appreciable reduction in suicide could be achieved through more concerted universal (population based) strategies to reduce the level of use of these substances among youth and the general community. Such strategies need to include explicit health messages alerting young people and the community at large to the increased risks for depression and suicidal behaviour associated with harmful levels of alcohol, cannabis and other illicit substances.

Recommendation 5

A comprehensive range of strategies is required to delay the average age of onset in the use of tobacco and alcohol, which may operate as ‘gateway’ substances to cannabis and other illicit drugs. This should include curriculum and ‘whole school’ approaches to prevention and health promotion; continuing universal exposure of young Western Australians to the K-12 Drug Education Package; and other practical measures to limit the access of young adolescents to tobacco and alcohol.

Accumulating evidence supporting the ‘gateway’ theory of illicit drug use points to the need for increased investment in programs of prevention to reduce the average age of onset of tobacco, alcohol and cannabis use by young people. Strategies to achieve this should include health education from the earliest years of schooling to equip young people with information, life-skills and values which encourage the adoption of healthy lifestyles and behaviours which lessen the likelihood of these substances being used at an early age. Such measures are incorporated within the Drug Education Package of the Western Australian K-12 Health Education Curriculum and are potentially available to all Western Australian school students (School Drug Education Project, 1998a; School Drug Education Project, 1998b). However, many high school students do not often select Health Education as an option.

Serious consideration therefore needs to be given to funding means of ensuring a more universal exposure, and a whole school approach for Western Australian children and young people to the life-skills, drug education and harm reduction strategies provided through this curriculum. At the same time there is a continuing need for active measures to limit the easy availability of alcohol and tobacco to minors. Restricting the opportunities for access to these ‘gateway substances’ is an essential step to limiting the onset of cannabis and other illicit drug use. This should include better enforcement of existing regulations and stricter penalties for the sale and supply of tobacco and alcohol to minors and for permitting the access of minors to licensed premises.

Recommendation 6

Public education and media campaigns are needed to change community attitudes and norms regarding the ‘acceptance’ of underage drinking and adolescent ‘binge’ drinking.

This should include greater use of ‘youth friendly’ media such as the ABC’s Triple-J, youth oriented web sites such as ‘Reach Out’ and the Office of Youth Affairs’ .U website. Other youth oriented strategies that should be supported to communicate these health messages include the use of youth music, arts and drama events such as ‘The Rock Eisteddfod’ and the ‘Youth on Health Drama Festival’.

Recommendation 7

Harm reduction strategies based on the encouragement of responsible drinking need to be backed by the encouragement of responsible hotel licensing and effective regulation of retail practices to reduce opportunities for hazardous levels of alcohol consumption.

Existing ‘accord’ arrangements between local councils, police and hotel licensees should be extended to encourage the training and support of publicans and hotel staff in the promotion of responsible drinking by young people. Special licensing arrangements (eg. extended hours applications) should be limited as far as possible by local councils in view of their potential to encourage hazardous levels of drinking by young people.

7.2 Recommendations for selective prevention

Recommendation 8

Groups of young people at higher than average risk for suicidal behaviour and drug use who should be targeted for selective interventions include males, children of drug users, young people showing early signs of depression and other mental health problems and/or those with a history of conflict in the family.

Other groups who should be targeted for selective prevention are youth in specific communities who are at higher than average risk by virtue of their exposure to the effects of socio-economic disadvantage and/or a high local incidence of youth behaviour problems including recent suicides. Such groups of 'at risk' and alienated youth have traditionally been targeted through a range of youth development, recreation and employment programs, 'drop in' centres and one-to-one youth work and counselling. Such programs need to be complemented by the range of systematic programs now available which screen to identify 'at risk' youth at earlier stages of problem development and which can be delivered cost-effectively in settings such as schools.

Promising Australian programs such as the 'Resourceful Adolescent Program' (RAP) and the 'Promoting Optimism WA', and US programs such as the 'Coping and Support Training' (CAST) delivered to 'at risk' groups of young adolescents need to be evaluated through larger scale demonstration projects implemented under 'real life' Western Australian circumstances. These should be commissioned in such a way as to encourage community-based services to form alliances with tertiary education institutions, which can provide the necessary evaluation expertise and infrastructure.

Recommendation 9

Local communities with high rates of adolescent problem behaviours should be supported to mobilise and implement comprehensive evidence based prevention programs. While Local Drug Action Groups are effective in mobilising community action, suitable evidence based programs should also be implemented.

Evaluated programs such as the 'Communities that Care' (CTC) program implemented in selected 'high risk' communities have significant potential for improving inter-agency collaboration, reducing the duplication of services, coordinating allocation of resources and increasing the leveraging of resources for prevention programming. The increased involvement of professionals, concerned citizens and youth in community prevention activities should also be enhanced by CTC.

Recommendation 10

Further research is needed to address male gender issues in the aetiology of drug use and suicide and to develop effective prevention and intervention strategies that address the needs of young males.

The susceptibility of young males to using alcohol and/or other drugs to deal with emotional problems and their general reluctance to seek help for personal difficulties is well recognised but few systematic efforts have been made to address these and other male youth health issues associated with their higher rates of substance use and suicide.

7.3 Recommendations for indicated prevention

Recommendation 11

Referral and admission criteria to mental health and substance use services need to ensure that young people with dual diagnosis who are at risk of suicide receive appropriate care and are not inadvertently excluded from treatment.

Addressing the needs of youth with both substance use and psychiatric conditions present specific challenges in clinical management. As this appears to be a growing problem, pre- and in- service professional education of mental health workers, drug and alcohol workers and professional staff in emergency medicine settings should provide more information about the effects of alcohol and other

drugs on specific mental health disorders and offer skills training in the clinical assessment and treatment of youth with co-existing substance use, mental health issues and suicidality.

Effective performance partnerships need to be developed between mental health, emergency medicine and drug abuse treatment services. These could involve jointly developed referral protocols, consultancy agreements and joint case management where this is indicated. The integration of the Health Department of WA's Alcohol and Drug Policy Branch within the Mental Health Division is assisting to instigate services for people with diagnosed psychiatric disorders and alcohol and other drug problems (Health Department of WA, 2000).

This issue is also being addressed in the 'Next Step' youth substance abuse service which is seeking to develop a more comprehensive and accessible substance misuse service for youth (Towers, 2000). Extending the availability of such treatment and prevention services should be a high priority for Western Australia.

7.4 Recommendations for monitoring and surveillance

Recommendation 12

A better integration of existing administrative data systems and periodic population surveys is needed to enable the ongoing prevalence monitoring of youth alcohol and other drug use, mental health problems and suicidal behaviour as well as some of their key causal risk factors.

The availability of such integrated surveillance processes is essential for the systematic targeting and evaluation of these outcomes of concern. The inclusion of selected risk factors in such surveillance systems will also help to provide an early indication of the appropriateness and effectiveness of new preventive measures being implemented.

8. References

- Allebeck, P. (1991). Cannabis and Schizophrenia: Is There a Causal Association? In G. G. Nahas & C. Latour (Eds), *Physiopathology of Illicit Drugs: Cannabis, Cocaine, Opiates*. Oxford: Pergamon Press.
- Allebeck, P., & Allgulander, C. (1990a). Psychiatric Diagnoses as Predictors of Suicide: A comparison of diagnoses at conscription and in psychiatric care in a cohort of 50,465 young men. *British Journal of Psychiatry*, *157*, 339-344.
- Allebeck, P., & Allgulander, C. (1990b). Suicide among young men: Psychiatric illness, deviant behaviour and substance abuse. *Acta Psychiatrica Scandinavica*, *81*(6), 565-570.
- Allebeck, P., Allgulander, C., & Fisher, L. D. (1988). Predictors of completed suicide in a cohort of 50,465 young men: role of personality and deviant behaviour. *British Medical Journal*, *297*(6642), 176-8.
- Andreasson, S., & Allebeck, P. (1990). Cannabis and mortality among young men: a longitudinal study of Swedish conscripts. *Scandinavian Journal of Social Medicine*, *18*(1), 9-15.
- Appleby, L. (2000). Drug misuse and suicide: a tale of two services. *Addiction*, *95*(2), 175-7.
- Appleby, L., Cooper, J., Amos, T., & Faragher, B. (1999). Psychological autopsy study of suicides by people aged under 35. *British Journal of Psychiatry*, *175*, 168-174.
- Australian Institute of Family Studies (1999a). Programs for Parents. *Youth Suicide Prevention Bulletin*, January, pp. 30.
- Australian Institute of Family Studies (1999b). *Youth suicide prevention programs and activities. National Stocktake October 1999*. Australia: Australian Institute of Family Studies.
- Australian Institute of Health and Welfare (2000). *1998 National drug strategy household survey*. Australian Institute of Health and Welfare.
- Author Unknown (nd). *Handbook for Medical Practitioners and Other Health Care Workers on Alcohol and Other Drug Problems*.
- Barone, C., Weissberg, R. P., Kaspro, W. J., Voyce, C. K., Arthur, M. W., & Shriver, T. P. (1995). Involvement in multiple problem behaviours of young urban adolescents. *Journal of Primary Prevention*, *15*(3), 261-283.
- Beautrais, A. L., Joyce, P. R., & Mulder, R. T. (1998). Psychiatric illness in a New Zealand sample of young people making serious suicide attempts. *New Zealand Medical Journal*, *111*(1060), 44-8.
- Beautrais, A. L., Joyce, P. R., & Mulder, R. T. (1999). Cannabis abuse and serious suicide attempts. *Addiction*, *94*(8), 1155-1164.
- Beck, A. T., & Steer, R. A. (1989). Clinical predictors of eventual suicide: A 5- to 10-year prospective study of suicide attempters. *Journal of Affective Disorders*, *17*(3), 203-209.
- Berglund, M., Krantz, P., & Lundqvist, G. (1987). Suicide in alcoholism: A prospective study of 55 cases with autopsy findings. *Acta Psychiatrica Scandinavica*, *76*(4), 381-385.
- Birckmayer, J., & Hemenway, D. (1999). Minimum-age drinking laws and youth suicide, 1970-1990. *American Journal of Public Health*, *89*(9), 1365-8.

- Black, D. W., Yates, W., Petty, F., & Noyes, R. (1986). Suicidal behavior in alcoholic males. *Comprehensive Psychiatry*, 27(3), 227-235.
- Borges, G., Anthony, J. C., & Garrison, C. Z. (1995). Methodological issues relevant to epidemiological investigations of suicidal behaviours of adolescents. *Epidemiological Reviews*, 17(1), 228-239.
- Borges, G., Walters, E. E., & Kessler, R. C. (2000). Associations of Substance Use, Abuse, and Dependence with Subsequent Suicidal Behaviour. *American Journal of Epidemiology*, 151(8), 781-789.
- Botvin, G. J., Griffin, K. W., Diaz, T., Scheier, C. W., & Epstein, J. A. (2000). Preventing Illicit drug use in adolescents: Long term follow up data from a randomized control trial of a school population. *Addictive Behaviours*, 25(5), 769-774.
- Brent, D., Perper, J., Goldstein, C., & Kolko, D. (1988). Risk factors for adolescent suicide: A comparison of adolescent suicide victims with suicidal inpatients. *Archives of General Psychiatry*, 45(6), 581-588.
- Brent, D. A. (1995). Risk factors for adolescent suicide and suicidal behavior: Mental and substance abuse disorders, family environmental factors, and life stress. *Suicide & Life-Threatening Behavior*, 25, 52-63.
- Brent, D. A., Perper, J. A., & Allman, C. J. (1987). Alcohol, firearms and suicide among young. *JAMA*, 257, 3369-3372.
- Brent, D. A., Perper, J. A., Moritz, G., & Baugher, M. (1993). Stressful life events, psychopathology, and adolescent suicide: A case control study. *Suicide & Life-Threatening Behavior*, 23(3), 179-187.
- Brounstein, P. J., & Zweig, J. M. (1999). *Understanding substance abuse prevention. Toward the 21st century: A primer on effective programs*. USA: Substance Abuse and Mental Health Services Administration (SAMHSA); Department of Health and Human Services.
- Bukstein, O. G., Brent, D. A., Perper, J. A., Moritz, G., Baugher, M., Schweers, J., Roth, C., & Balach, L. (1993). Risk factors for completed suicide among adolescents with a lifetime history of substance abuse: A case-control study. *Acta Psychiatrica Scandinavica*, 88(6), 403-408.
- Cahill, H. (Ed.). (2000). *Mind matters: A mental health promotion resource for secondary schools*. Melbourne, Australia: Commonwealth of Australia.
- Centers for Disease Control and Prevention (CDC) (2000). *CDC surveillance summaries: Youth risk behaviour surveillance, United States, 1999 (SS-5)*. US Department of Health and Human Services.
- Cheng, A. A. T., Mann, A. H., & Chan, K. A. (1997). Personality disorder and suicide: A case-control study. *British Journal of Psychiatry*, 171, 441-446.
- Cheng, A. T. A. (1995). Mental illness and suicide: A case-control study in East Taiwan. *Archives of General Psychiatry*, 52(7), 594-603.
- Codde, J. (1998). Rates Calculator, Ver. 8.2.9 (software program). Perth: Health Department of W.A.
- Codde, J., Roberts, M., & Gill, L. (1997). *Determination of population estimates for health zones and health services by age, sex and Aboriginality, 1981-1995*. Health Department of WA.
- Coffee, C., Lynskey, M., Wolfe, R., & Patton, G. C. (2000). Initiation and progression of cannabis use in a population based Australian adolescent longitudinal study. *Addiction*, 95(11), 162-169.

- Commonwealth Department of Health and Aged Care (2000). *LIFE - Living is for everyone: A framework for prevention of suicide and self-harm in Australia*. Commonwealth of Australia.
- Commonwealth Department of Health and Aged Care (NYSPS). (1999). *Setting the evidence-based research agenda for Australia: A literature review*. Canberra: Commonwealth of Australia.
- Cowen, E., & Work, W. (1988). Resilient children, psychological wellness and primary prevention. *American Journal of Community Psychology*, 16, 591-607.
- Crome, I. B. (1999a). Overview: Psychiatric comorbidity and substance misuse: What are the issues? *Drugs: Education, Prevention and Policy*, 6(2), 149-150.
- Crome, I. B. (1999b). Substance misuse and psychiatric comorbidity: Towards improved service provision. *Drugs: Education, Prevention and Policy*, 6(2), 151-174.
- Crumley, F. E. (1990). Substance abuse and adolescent suicidal behavior. *JAMA*, 263(22), 3051-6.
- Curtin University of Technology (2000). *School drug education project: Process evaluation report, 2000*. Centre for Health Promotion Research, Curtin University of Technology.
- Darke, S., Ross, J., Zador, D., & Sunjic, S. (2000). Heroin related deaths in New South Wales, Australia, 1992-1996. *Drug and Alcohol Dependence*, 60(2), 141-150.
- Davis, C., Martin, G., Kosky, R., & O'Hanlon, O. (1999). *National stocktake of prevention and early intervention programs*. Australia: AusEinet.
- Diekstra, R. F. W., Kienhorts, C. W. M., & de Wilde, E. J. (1995). Suicide and suicidal behaviour among adolescents. In M. Rutter & D. J. Smith (Eds), *Psychosocial disorders in young people: Time trends and their causes* (pp. 686-761). London: John Wiley & Sons.
- Doll, R. (1997). Weak associations in epidemiology: Importance, detection and interpretation. *Journal of Epidemiology*, 6(4), S-11-S-20.
- Donnelly, N., & Hall, W. (1994). *Patterns of Cannabis Use in Australia* (National Drug Strategy Monograph Series No. 27). Australian Government Publishing Service.
- Donovan, J., & Jessor, R. (1985). Structure of problem behaviour in adolescence and young adulthood. *Journal of Consulting and Clinical Psychology*, 53, 890-904.
- Donovan, J., Jessor, R., & Costa, F. M. (1985). Syndrome of problem behaviour in adolescence : A replication. *Journal of Consulting and Clinical Psychology*, 56, 800-814.
- Downey, A. M. (1991). The impact of drug abuse upon adolescent suicide. *Omega - Journal of Death & Dying*, 22(4), 261-275.
- Driessen, M., Veltrup, C., Weber, J., John, U., Wetterling, T., & Dilling, H. (1998). Psychiatric comorbidity, suicidal behaviour and suicidal ideation in alcoholics seeking treatment. *Addiction*, 93(6), 889-894.
- English, O. R., Holman, C. D. J., Milne, E., Winter, M. G., Hulse, G. K., Codde, J. P., Corti, B., Dawes, V., deKlerk, N., Knuiman, M. W., Kurinczuk, J. J., Lewin, G. F., Ryan, G. A. (1995). *The quantification of drug cause morbidity and mortality in Australia, 1995 edition*. Canberra: Commonwealth Department of Human Services and Health.

- Farrell, A. D., Danish, S. J., & Howard, C. W. (1992). Relationship between drug use and other problems in urban adolescents. *Journal of Consulting and Clinical Psychology, 60*(5), 705-712.
- Farrell, M., Neeleman, J., Griffiths, P., & Strang, J. (1996). Suicide and overdose among opiate addicts. *Addiction, 91*(3), 321-323.
- Fergusson, D. M., & Horwood, L. J. (2000). Does cannabis use encourage other forms of illicit drug use? *Addiction, 95*(4), 505-20.
- Fergusson, D. M., Woodward, L. J., & Horwood, L. J. (2000). Risk factors and life processes associated with the onset of suicidal behaviour during adolescence and early adulthood. *Psychological Medicine, 30*(1), 23-39.
- Fisher, J., & Bowen, S. (1998). *An evaluation of Live the Future drug and alcohol information unit*. Australia: State Library of NSW.
- Fombonne, E. (1998). Suicidal behaviors in vulnerable adolescents: Time trends and their correlates. *British Journal of Psychiatry, 173*, 154-159.
- Forman, S. G., & Kalafat, J. (1998). Substance abuse and suicide: Promoting resilience against self-destructive behavior in youth. *School Psychology Review, 27*(3), 1998.
- Foster, T., Gillespie, K., & McClelland, R. (1997). Mental disorders and suicide in Northern Ireland. *British Journal of Psychiatry, 170*, 447-452.
- Fowler, R. C., Rich, C. L., & Young, D. (1986). San Diego suicide study: II. Substance abuse in young cases. *Archives of General Psychiatry, 43*(10), 962-965.
- Frances, R. J., Franklin, J., & Flavin, D. K. (1987). Suicide and alcoholism. *American Journal of Drug & Alcohol Abuse, 13*(3), 327-341.
- Garnezy, N. (1991). Resilience in children's adaptation to negative life events and stressed environments [see comments]. *Pediatric Annals, 20*(9), 459-60, 463-6.
- Garnezy, N. (1993). Children in poverty: resilience despite risk. *Psychiatry, 56*(1), 127-36.
- Goldney, R. D., Wilson, D., Dal Grande, E., Fisher, L. J., & McFarlane, A. C. (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*, 98-106.
- Graham, C., & Burvill, P. W. (1992). A study of Coroner's records of suicide in young people. *Australian and New Zealand Journal of Psychiatry, 26*(1), 30-39.
- Gruenewald, P. J., Ponicki, W. R., & Mitchell, P. R. (1995). Suicide rates and alcohol consumption in the United States, 1970-89. *Addiction, 90*(8), 1063-1075.
- Hall, W., Solowij, N., & Dafour, M. C. (1994). *The Health and Psychological Consequences of Cannabis Use* (National Drug Strategy Monograph Series No. 25). Australian Government Publishing Service.
- Harris, E. C., & Barraclough, B. (1997). Suicide as an outcome for mental disorders: A meta-analysis. *British Journal of Psychiatry, 170*(3), 205-228.
- Harris, R., Linn, M. W., & Hunter, K. I. (1979). Suicide attempts among drug abusers. *Suicide & Life Threatening Behavior, 9*(1), 25-32.

- Hawkins, J. D., & Catalano, R. F., Jr. (1992). *Communities that care: Action for drug abuse prevention*. San Francisco, CA, USA: Jossey-Bass Inc, Publishers.
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, *112*(1), 64-105.
- Hawkins, J. D., Jenson, J. M., Catalano, R. F., & Lishner, D. M. (1988). Delinquency and drug abuse: Implications for social services. *Social Services Review*, *62*, 258-284.
- Hawton, K. (1994). Adolescent suicide and attempted suicide: the importance of substance abuse. *Crisis*, *15*(1), 13-4.
- Hawton, K., Fagg, J., Platt, S., & Hawkins, M. (1993). Factors associated with suicide after parasuicide in young people. *British Medical Journal*, *306*(6893), 1641-4.
- Hawton, K., Houston, K., & Shepperd, R. (1999). Suicide in young people: Study of 174 cases, aged under 25 years, based on coroners' and medical records. *British Journal of Psychiatry*, *175*, 271-276.
- Hayward, L. (1989). *Drug use, drug abuse and suicide*. Health Department of WA.
- Hayward, L., Zubrick, S. R., & Silburn, S. (1992). Blood alcohol levels in suicide cases. *Journal of Epidemiology & Community Health*, *46*(3), 256-260.
- Hazell, P. (2000). Treatment strategies for adolescent suicide attempters. In K. Hawton & K. van Heeringen (Eds), *The international handbook of suicide and attempted suicide* (pp. 539-554). Chichester: John Wiley & Sons.
- HDWA Mental Health Division (1999). *Proceedings from the Metropolitan and Rural/Remote Child and Adolescent Mental Health Services Review*. Health Department of WA.
- Health Department of WA (1999). *Drug strategy, 1999-2003: InterAction*. Health Department of WA.
- Health Department of WA (2000). *Mental Health Reforms in Western Australia*. Health Department of WA.
- Higgins, K., Cooper-Stanbury, M., & Williams (2000). *Statistics on Drug Use in Australia*. Australian Institute of Health and Welfare.
- Hillman, S. D., Silburn, S. R., Zubrick, S. R., & Nguyen, H. (2000). *Suicide in Western Australia 1986 to 1997*. Youth Suicide Advisory Committee, TVW Telethon Institute for Child Health Research, and Centre for Child Health Research, Faculty of Medicine and Dentistry, The University of Western Australia.
- Hirschfeld, R. M., & Davidson, L. (1988). Clinical risk factors for suicide. *Psychiatric Annals*, *18*(11), 628-635.
- Hunter, E. (1995). Is there a role for prevention in Aboriginal mental health? *Australian Journal of Public Health*, *19*(6), 573-579.
- Isometsae, E., Heikkinen, M., Henriksson, M., Marttunen, M., Aro, H., & Loennqvist, J. (1997). Differences between urban and rural suicides. *Acta Psychiatrica Scandinavica*, *95*(4), 297-305.
- Jaycox, L. H., Reivich, K. J., Gillham, J., & Seligman, M. E. (1994). Prevention of depressive symptoms in school children. *Behaviour Research and Therapy*, *32*(8), 801-816.

- Jenkin, C., & Bretherton, D. (1994). *PACE - Parenting adolescents: A creative experience*. Australian Council for Education Research.
- Jessor, R., Chase, J. A., & Donovan, J. (1980). Psychosocial correlates of marijuana use and problem drinking in a national sample of adolescents. *American Journal of Public Health, 70*, 604-613.
- Johnsson, E., & Fridell, M. (1997). Suicide attempts in a cohort of drug abusers: A 5-year follow-up study. *Acta Psychiatrica Scandinavica, 96*(5), 362-366.
- Jones, G. D. (1997). The role of drugs and alcohol in urban minority adolescent suicide attempts. *Death Studies, 21*(2), 182-202.
- Kaminer, Y. (1996). Adolescent substance abuse and suicidal behavior. *Child and Adolescent Psychiatric Clinics of North America, 5*, 59-71.
- Kandel, D., & Faust, R. (1975). Sequences and stages in patterns of adolescent drug use. *Archives of General Psychiatry, 32*, 923-932.
- Kandel, D., & Yamaguchi, K. (1993). From beer to crack: Developmental patterns of drug involvement. *American Journal of Public Health, 83*(6), 851-855.
- Khantzian, E. J. (1985). The self medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. *The American Journal of Psychiatry, 142*(11), 1259-1264.
- Kienhorst, C. W., de Wilde, E. J., Diekstra, R. F., & Wolters, W. H. (1992). Differences between adolescent suicide attempters and depressed adolescents. *Acta Psychiatrica Scandinavica, 85*(3), 222-228.
- Kjelsberg, E., Winther, M., & Dahl, A. A. (1995). Overdose deaths in young substance abusers: Accidents or hidden suicides? *Acta Psychiatrica Scandinavica, 91*, 236-242.
- Lesage, A. D., Boyer, R., Grunberg, F., & Vanier, C. (1994). Suicide and mental disorders: A case-control study of young men. *American Journal of Psychiatry, 151*(7), 1064-1068.
- Lester, D. (1999). Suicidality and risk-taking behaviors: An ecological study of youth behaviors in 29 states. *Perceptual & Motor Skills, 88*(3, Pt 2), 1299-1300.
- Levy, J. C., & Deykin, E. Y. (1988). Suicidality, depression, and substance abuse in adolescence. *American Journal of Psychiatry, 146*(11), 1462-1467.
- Lynskey, M., & Hall, W. (1998). *Jurisdictional Trends in Opiate Overdose Deaths, 1988-1996* (Technical Report No. 54). National Drug and Alcohol Research Centre, University of New South Wales.
- MacCoun, R. (1998). In what sense (if any) is marijuana a gateway drug? *FAS Drug Policy Analysis Bulletin, 4*(Feb).
- MacKinnon, C. J., Conroy, M. E., Emans, S. J., & Woods, E. R. (1993). Mediating mechanisms in a school based drug prevention program: First year effects of the Midwestern Prevention Project. *Health Psychology, 10*, 164-168.
- Madianos, M. G., Gefou-Madianou, D., & Stefanis, C. N. (1994). Symptoms of depression, suicidal behaviour and use of substances in Greece: A nationwide general population survey. *Acta Psychiatrica Scandinavica, 89*(3), 159-166.

- Magnusson, D. (1995). Individual development: A holistic, integrated model. In P. Moen, G. H. Elder, & K. Luscher (Eds), *Examining lives in context* (pp. 708). Washington, DC: American Psychological Society.
- Makkai, T., & McAllister, I. (1998). *Patterns of Drug Use in Australia 1985-95* (National Drug Strategy Publication No. 2205). Commonwealth Department of Health and Family Services.
- Maris, R. (1981). *Pathways to suicide: A survey of self-destructive behaviors*. Baltimore: John Hopkins University Press.
- Marttunen, M., Aro, H., Henriksson, M., & Loennqvist, J. (1991). Mental disorders in adolescent suicide: DSM-III-R Axes I and II diagnoses in suicides among 13- to 19-year-olds in Finland. *Archives of General Psychiatry*, 48(9), 834-838.
- Matthews, P., & Foreman, J. (1993). *Jervis on the Office and Duties of Coroners*. (11th Ed. ed.). London: Sweet and Maxwell Ltd.
- Merrill, J. C., Kleber, H. D., Shwartz, M., Liu, H., & Lewis, S. R. (1999). Cigarettes, alcohol, marijuana, other risk behaviors, and American youth. *Drug and Alcohol Dependence*, 56, 205-212.
- Milne, S., Matthews, K., & Ashcroft, G. W. (1994). Suicide in Scotland 1988-1989: Psychiatric and physical morbidity according to primary care case notes. *British Journal of Psychiatry*, 165(4), 541-544.
- Ministerial Council on Drug Strategy (1998). *National Drug Strategic Framework, 1998-99 to 2002-03: Building partnerships - A strategy to reduce the harm caused by drugs in our community*. Commonwealth of Australia.
- Mino, A., Bousquet, A., & Broers, B. (1999). Substance abuse and drug-related death, suicidal ideation and suicide: A review. *Crisis*, 20(1), 28-35.
- Miotto, K., McCann, M. J., Rawson, R., A., Frosch, D., & Ling, W. (1997). Overdose, suicide attempts and death among a cohort of naltrexone treated opioid addicts. *Drug and Alcohol Dependence*, 45, 131-134.
- Motto, J. A. (1980). Suicide risk factors in alcohol abuse. *Suicide & Life Threatening Behavior*, 10(4), 230-8.
- Mrazek, P. J. & Heggarty, R. J. (Eds.). (1994). *Reducing the risks for mental disorders: Frontiers for preventive intervention research*. Washington DC: National Academy Press.
- Murphy, G. E. (1986). Suicide in alcoholism. In A. Roy (Ed.), *Suicide*. Baltimore: Williams & Wilkins.
- Murphy, G. E. (1988). Suicide and substance abuse. *Archives of General Psychiatry*, 45(6), 593-4.
- Murphy, G. E. (2000). Psychiatric aspects of suicidal behaviour: Substance abuse. In Hawton, K. & van Heeringen, K. (Eds), *The international handbook of suicide and attempted suicide* (pp. 135-146). England: John Wiley & Sons, Ltd.
- Murphy, G. E., Wetzel, R. D., Robins, E., & McEvoy, L. (1992). Multiple risk factors predict suicide in alcoholism. *Archives of General Psychiatry*, 49(6), 459-463.
- National Health Service (UK) (1999). *Safer Services: Report of the National Confidential Inquiry into suicide and homicide by people with mental illness*. National Health Service.

- National Institute on Drug Abuse (1997). Preventing drug use among children and adolescents: A research-based guide. USA: NIDA.
- Neeleman, J., & Farrell, M. (1997). Suicide and substance misuse. *British Journal of Psychiatry*, 171, 303-304.
- Negrete, J. C. (1984). *Clinical psychiatric complications of cannabis use: An update*. Paper presented at the Marihuana '84; Proceedings of the Oxford symposium of cannabis, Oxford, UK.
- Nelson, P. L. (1993). A critical review of the research literature concerning some biological and psychological effects of cannabis. In Advisory Committee on Illicit Drugs (Ed.), *Cannabis and the law in Queensland: A discussion paper* (pp. 113-152). Brisbane: ACID.
- New Zealand House of Representatives (1998). *Inquiry into the mental health effects of cannabis*. NZ: New Zealand Government.
- Norstroem, T. (1995). Alcohol and suicide: A comparative analysis of France and Sweden. *Addiction*, 90(11), 1463-1469.
- NSW Department of Health, NSW Department of School Education, Catholic Education Commission NSW, & Association of Independent Schools (1996). *Towards a health promoting school*. NSW Department of Health.
- Offord, D. R., Kramer, H. C., Kazdin, A. E., Jensen, P. S., & Harrington, R. (1998). Lowering the burden of suffering from child psychiatric disorder: Trade-offs among clinical, targeted and universal interventions. *Journal of the American Academy of Child and Adolescent Psychiatry*, 37(7), 686-694.
- Oyefeso, A., Ghodse, H., Clancy, C., Corkery, J., & Goldfinch, R. (1999). Drug abuse-related mortality: A study of teenage addicts over a 20-year period. *Social Psychiatry & Psychiatric Epidemiology*, 34(8), 437-441.
- Oyefeso, A., Ghodse, H., Clancy, C., & Corkery, J. M. (1999). Suicide among drug addicts in the UK. *British Journal of Psychiatry*, 175, 277-282.
- Patton, G., & Burns, J. (1998). *Preventative interventions for youth suicide: A risk factor based approach*. National Health and Medical Research Council.
- Patton, G. C., Harris, J. B., Carlin, J. B., Schwartz, M., & Bowes, G. (1997). Adolescent Suicidal Behaviours: A Population-Based Study of Risk. *Psychological Medicine*, 27, 715-724.
- Perry, C. L. (1996). WHO collaborative study on alcohol education and young people: Outcomes of a four country pilot study. *The International Journal of Addictions*, 24, 1145-1171.
- Pirkola, S. P., Isometsae, E. T., Heikkinen, M. E., & Loennqvist, J. K. (2000). Suicides of alcohol misusers and non-misusers in a nationwide population. *Alcohol & Alcoholism*, 35(1), 70-75.
- Pirkola, S. P., Marttunen, M. J., Henriksson, M. M., Isometsae, E. T., Heikkinen, M. E., & Loennqvist, J. K. (1999). Alcohol-related problems among adolescent suicides in Finland. *Alcohol & Alcoholism*, 34(3), 320-329.
- Posey, S., Wong, S. C., Catalano, R. F., Hawkins, J. D., Dusenbury, L., & Chappell, P. J. (1996). *Communities that care. Prevention strategies: A research guide to what works*. Seattle, USA: Developmental Research and Programs, Inc.
- Raphael, B. (1993). *Prevention in the mental health field: Report to the Mental Health Committee*. National Health and Medical Research Council.

- Ravinus, T. (1990). The deadly embrace: The suicidal impulse and substance use and abuse in the college student. *Journal of College Student Psychotherapy*, 4, 45-77.
- Resnick, M. D., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J., Tabor, J., Beuhring, T., Sieving, R. E., Shew, M., Ireland, M., Bearinger, L. H., & Udry, J. R. (1997). Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health [see comments]. *JAMA*, 278(10), 823-32.
- Rich, C. L., Young, D., & Fowler, R. C. (1986). San Diego suicide study I: Young vs old subjects. *Archives of General Psychiatry*, 43(6), 577-582.
- Roberts, C., Bishop, B., & Fenton, J. (2000). *Anxiety and depression in rural school children*. Paper presented at the 23rd National Conference of the Australian Association for Cognitive and Behaviour Therapy, Melbourne, Victoria.
- Rossow, I., & Amundsen, A. (1995). Alcohol abuse and suicide: A 40-year prospective study of Norwegian conscripts. *Addiction*, 90(5), 685-691.
- Rothman, K. J. (1986). *Modern Epidemiology*. Boston, USA: Little, Brown and Co.
- Runeson, B. (1989). Mental disorder in youth suicide: DSM-III-R Axes I and II. *Acta Psychiatrica Scandinavica*, 79(5), 490-497.
- Runeson, B. (1990). Psychoactive substance use disorder in youth suicide. *Alcohol & Alcoholism*, 25(5), 5651-5658.
- Rutter, M. (1985). Resilience in the face of adversity: Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry*, 147, 598-611.
- Sanders, M. R. (1999). Triple-P Positive Parenting Program: Towards an empirically validated multilevel parenting and family support strategy for the prevention of behavior and emotional problems in children. *Clinical Child and Family Psychology Review*, 2(2), 71-90.
- Sawyer, M. G. (2000). *The Mental Health of Young People in Australia: Child and Adolescent Component of the National Survey of Mental Health and Well-Being* (In Press). Commonwealth Department of Health and Aged Care.
- School Drug Education Project (1998a). *School drug education task force: Strategic plan, 1997-2000* (2nd ed.). Education Department of WA.
- School Drug Education Project (1998b). *School drug education task force: Drug education, principles of best practice*. Education Department of WA.
- Schuckit, M. A. (1986). Primary men alcoholics with histories of suicide attempts. *Journal of Studies on Alcohol*, 47(1), 78-81.
- Select Committee into the Misuse of Drugs Act 1981 (1998). *Finding the right balance: Working together as a community to prevent harm from illicit drugs and to help individuals and families in need*. State Law Publisher, Legislative Assembly of WA.
- Serafino, S., Somerford, P., & Codde, J. (2000). *Hospitalisation as a consequence of deliberate self-harm in Western Australia, 1981-1998*. Health Department of Western Australia.
- Shaffer, D., Gould, M., Fisher, P., & Trautman, P. (1996). Psychiatric diagnosis in child and adolescent suicide. *Archives of General Psychiatry*, 53(4), 339-348.

- Shafii, M., Carrigan, S., Whittinghill, J. R., & Derrick, A. (1985). Psychological autopsy of completed suicide in children and adolescents. *American Journal of Psychiatry*, *142*(9), 1061-1106.
- Shafii, M., Steltz-Lenarsky, J., Derrick, A. M., & Beckner, C. (1988). Comorbidity of mental disorders in the post-mortem diagnosis of completed suicide in children and adolescents. *Journal of Affective Disorders*, *15*(3), 227-230.
- Silbereisen, R. K., Robins, L., & Rutter, M. (1995). Secular trends in substance abuse: Concepts and data on the impact of social change on alcohol and drug abuse. In M. Rutter & D. J. Smith (Eds), *Psychosocial disorders in young people: Time trends and their causes* (pp. 490-543). London: John Wiley & Sons.
- Silburn, S. (1999). Frameworks for conceptualising youth suicide prevention. *Youth Suicide Prevention Bulletin*, *2*, 21-24.
- Silburn, S. R., Zubrick, S. R., & Acres, J. (1997). *Evaluation of an intervention to facilitate better hospital and community management of teenage deliberate self-harm admissions in Western Australia*. Paper presented at the XIX Congress of the International Congress of the International Association for Suicide Prevention, Adelaide, Australia.
- Silburn, S. R., Zubrick, S. R., Hayward, L., & Reidpath, D. (1991). *Attempted suicide among Perth youth*. Health Department of WA.
- Skog, O. J. (1993). Alcohol and suicide in Denmark: Experiences from a 'natural experiment'. *Addiction*, *88*(9), 1189-1193.
- Skog, O. J., Teixeira, Z., Barrias, J., & Moreira, R. (1995). Alcohol and suicide: The Portuguese experience. *Addiction*, *90*(8), 1053-1061.
- Smith, D., & Burvill, P. W. (1991). Relationship between alcohol consumption and attempted suicide morbidity rates in Perth, Western Australia, 1968-1984. *Addictive Behaviours*, *16*(1-2), 57-61.
- Smith, D. J., & Rutter, M. (1995). Time trends in psychosocial disorders of youth. In M. Rutter & D. J. Smith (Eds), *Psychosocial disorders in young people*. Brisbane: John Wiley & Sons.
- Sperry, K., & Sweeney, E. (1989). Suicide by intravenous injection of cocaine: A report of three cases. *Journal of Forensic Sciences*, *34*(1), 244-248.
- Spoth, R., Redmond, C., Hockday, C., & Yoo, S. (1996). Protective factors and young adolescent tendency to abstain from alcohol use: A model using two waves of international study data. *American Journal of Community Psychology*, *24*, 749-770.
- Tanti, C. (1998). Why SUMMITT? *Parity*, *11*(8), 8-9.
- Taylor, S. P., & Chermack, S. T. (1993). Alcohol, drugs and human physical aggression. *Journal of Studies of Alcohol*, *11*(Supplement), 78-88.
- Tobler, N. S. (1997). *Meta-analysis of adolescent drug prevention programs: Results of the 1993 meta-analysis*. USA: NIDA.
- Tondo, L., Baldessarini, R. J., Hennen, J., Minnai, G. P., Salis, P., Scamonatti, L., Masia, M., Ghiani, C., & Mannu, P. (1999). Suicide attempts in major affective disorder patients with comorbid substance use disorders. *Journal of Clinical Psychiatry*, *60*(Suppl 2), 63-69.

- Toumbourou, J., & Gregg, E. (1999). *Evaluation of a program for parents: A national youth suicide prevention project*. Centre for Adolescent Health.
- Towers, T. (2000). Next-Step Drug and Alcohol Services.
- Trammel, R. L., Kurpius, S. E. R., & Metha, A. (1998). Suicide and substance abuse among student teachers. *Journal of Alcohol & Drug Education*, 43(2), 64-74.
- Tunving, K. (1985). Psychiatric effects of cannabis use. *Acta Psychiatrica Scandinavica*, 72(3), 209-217.
- Tunving, K., & Nilsson, K. (1985). Young female drug addicts in treatment: A twelve year perspective. *Journal of Drug Issues*, 15(3), 367-382.
- Unwin, E., & Codde, J. (1998). *Comparison of deaths due to alcohol, tobacco and other drugs in Western Australia and Australia*. Perth, WA: Health Department of Western Australia.
- Victorian Department of Human Services (2000). *Improving the lives of young Victorians in our community*. Victorian Government, DHS.
- Wagner, B. M. (1997). Family risk factors for child and adolescent suicidal behaviour. *Psychological Bulletin*, 121, 246-298.
- Wasserman, D., Vaernik, A., & Eklund, G. (1994). Male suicides and alcohol consumption in the former USSR. *Acta Psychiatrica Scandinavica*, 89(5), 306-313.
- Weiss, R. D., & Hufford, M. R. (1999). Substance abuse and suicide. In D. G. Jacobs (Ed.), *The harvard medical school guide to suicide assessment and intervention* (pp. 300-310). San Francisco: Jossey-Bass Inc, Publishers.
- Werner, E. E., & Smith, R. S. (1982). *Vulnerable but invincible*. New York: McGraw-Hill.
- Williams, R., & Morgan, H. G. (1994). *Suicide prevention - the change confronted*. London: HMSO.
- World Health Organisation (1986). *The International Classification of Diseases* (Vol. 1). (9th ed.). Michigan, USA: Commission on Professional and Hospital Activities.
- World Health Organisation (WHO) (1994). *Mental health programs in schools*. Division of Mental Health, WHO.
- Zubrick, S. R., Silburn, S. R., Garton, A., Burton, P., Dalby, R., Carlton, J., Shepherd, C., & Lawrence, D. (1995). *Western Australian child health survey: Developing health and well being in the nineties*. Australian Bureau of Statistics and Institute for Child Health Research.

9. Appendices

Appendix A

Table 13: Findings of studies on completed suicide and the association with illicit drugs and alcohol

Study: Author, Year, Location	Study Type: Level of Evidence	Study: Sample	Findings
Allebeck et al., 1988 Allebeck and Allgulander, 1990 Sweden	Cohort III-1	50 465 male national conscripts aged 18-21 yrs followed for 13 years	Those deceased through suicide were characterised by Drug and alcohol dependence Psychiatric disorder at conscription
Brent et al., 1993 Pittsburgh, USA	Case control III-2	67 suicides aged ≥ 19 yrs Males: 57 Females: 10 Controls: a community sample of 67 demographically matched subjects	Those deceased through suicide were characterised by: major depression bipolar mixed state substance use conduct disorder
Bukstein et al., 1993 Pensylvania, USA	Case control III-2	67 suicides aged ≥ 19 yrs Males: 57 Females: 10 Controls: a community sample of 67 demographically matched subjects	Those deceased through suicide were characterised by: major depression substance use (specifically alcohol)
Cheng et al., 1995 ; 1997 East Taiwan	Case control III-2	113 suicides Males: 72 Females: 45 Controls: 2 community members matched for age, sex and area of residence, randomly selected from census record	Those deceased through suicide were characterised by: substance use (specifically alcohol) major depression impulsive personality disorder adjustment disorder, anxiety disorders dysthymia
Foster et al., 1997 Northern Ireland	Cohort III-1	188 suicides ≥ 20 Males: 93 Females: 25	Those deceased through suicide were characterised by: alcohol dependence major depression anxiety disorder personality disorders (avoidant, paranoid & borderline)
Gruenewald et al., 1995 USA	Cross-section time series IV	Annual state level data on per capita suicide rates (period unspecified)	Found to be significantly associated with suicide were: alcohol consumption (specifically spirits) unemployment
Harris & Barraclough, 1997	Meta-analysis I	249 papers fulfilling set criteria: (see reference for details)	Those with a high risk for suicide were characterised by: schizophrenia mood disorders (major depression, bipolar & dysthymia) anxiety disorder psychoactive substance use disorder (alcohol dependence/use & opioid dependence/use)
Hawton et al., 1993 Edinburgh, Scotland	Cohort III-1	186 hospital admissions, 15-24 yrs, for self poisoning, follow-up	Those deceased through suicide were characterised by: substance use
Hawton et al., 1999 Oxford, UK	Cohort III-1	172 suicides aged 15-24 yrs who died between Jan 1990 and June 1995 Males: 148 Females: 26	Those deceased through suicide were characterised by: alcohol consumption just prior to death unemployment engaging in previous self harm

Study: Author, Year, Location	Study Type: Level of Evidence	Study: Sample	Findings
Hillman et al., 2000 Western Australia	Cohort III-1	2420 suicides between 1986 to 1997 Males: 1964 Females: 456	Those deceased through suicide were characterised by: previous suicide attempts depressive disorders schizophrenia substance use personality disorders
Isometsae et al., 1997 Finland	Cohort III-1	228 suicides between the period of April 1987 to March 1988 Males: 171 Females: 57	Those deceased through suicide were characterised by: depression psychoactive substance use disorders personality disorders (specifically cluster B: antisocial/borderline/histrionic/narcissistic)
Lesage et al., 1994 Montreal and Quebec City, Canada	Case control III-2	75 male suicides 18-35 yrs Controls: 75 aged and demographically matched controls	Those deceased through suicide were characterised by: major depression alcohol dependence psychoactive substance dependence schizophrenia
Milne et al., 1994 Scotland	Cohort III-1	665 suicides from 1988-1989 Males: 488 Females: 177	Those deceased through suicide were characterised by: depression alcohol use schizophrenia anxiety disorders
Murphy et al., 1992 Washington, USA	Meta analysis I	Study 1: 32 alcoholics who suicided Study 2: 50 alcoholics who suicided Males: 67, Females: 15 Current study: 67 alcoholics who suicided Controls: Community sample of 106 living alcoholics; and Clinical sample of 142 living alcoholics	Those alcoholics deceased through suicide were characterised by: major depression having very little or no social support being unemployed
Oyefeso, Ghodse, Clancy & Corkery, 1999 UK	Cohort III-1	298 drug addict suicides between the ages of 15-34 over a 25 year period (1968-1992) Males: 245 Females: 53	The risk of suicide among addicts is: 4 times higher than the normal population for males 11 times higher than the normal population for females 6-8 times more likely than persons of the same age in the general population.
Pirkola et al., 1999 Pirkola et al., 2000 Finland	Cohort III-1	116 suicides in the age group 13-22 yrs: Males: 97 Females: 19	Those deceased through suicide were characterised by: mood disorders (particularly depression) personality disorders alcohol use and dependence
Rich et al., 1986 San Diego, USA	Cohort III-1	204 suicides aged 15-65 yrs Males: 143 Females: 61	Those deceased through suicide were characterised by: affective disorders (major depression) substance disorders (drugs – not specified) schizophrenia

Study: Author, Year, Location	Study Type: Level of Evidence	Study: Sample	Findings
Rossov & Amundsen, 1995 Norway	Cohort III-1	40 000 male national conscripts from 1951 & 1952, aged 19 yrs – followed-up in 1991	Those deceased through suicide were characterised by: alcohol dependence and use confidence issues at time of conscription
Runeson, 1990 Sweden	Cohort III-1	58 consecutive suicides between 1984-1987 Males: 42 Females: 16	Those deceased through suicide were characterised by: major depression, adjustment disorder schizophrenia personality disorder psychoactive substance use disorder (mainly alcohol dependence)
Shaffer et al., 1996 New York, USA	Case control III-2	120 suicides aged >20 yrs Males: 95 Females: 25 Controls: 147 demographically matched control subjects Males: 116 Females: 31	Those deceased through suicide were characterised by: mood disorders including major depression disruptive disorders including conduct and oppositional disorder anxiety disorders substance use disorders including alcohol and drug use
Shafii et al., 1988 Louisville, USA	Case control III-2	21 suicides aged 11-19 yrs Males: 19 Females: 2 Controls: 21 matched controls	Those deceased through suicide were characterised by: major depression mood disorders (major depression, dysthymia) alcohol and/or drug use at least one serious diagnosable mental disorder
Skog, 1993 Denmark Skog et al., 1995 Portugal	Time series IV	All those deceased between the time period of 1931-1989	Those deceased through suicide were characterised by: feeble family integration lack of religious integration alcohol use
Wasserman et al., 1994 The Former USSR	Cohort III-1	916 315 violent deaths and poisoning; 77 837 deaths due to alcohol poisoning; 192 305 deaths due to suicide; 54 253 undetermined deaths : In the years 1984, 1986, 1988, & 1990.	Those deceased through suicide were characterised by: a positive correlation with alcohol consumption

Criteria for Grading Levels of Evidence

Level of evidence	Description
I	Evidence obtained from at least one meta-analysis
II-1	Evidence obtained from at least one randomised controlled trial
II-2	Evidence obtained from at least one controlled trial without randomisation
III-1	Evidence obtained from at least one cohort analytic study, preferably based in more than one centre or research group
III-2	Evidence obtained from at least one case control analytic study, preferably based in more than one centre or research group
IV	Evidence obtained from at least one study that has primarily descriptive study design such as a cross sectional, ecological or time series methodology
V	Opinions of respected authorities based on clinical experience or reports of expert committees

Appendix B

ICD9 E codes for classification of suicide

E950 Suicide and self inflicted poisoning by solid or liquid substances

- E950.0 'Analgesics et al'
- E950.1 'Barbiturates'
- E950.2 'Other sedatives & hypnotics'
- E950.3 'Tranquillisers & other psychotropics'
- E950.4 'Other specified drugs &/or medicines'
- E950.5 'Unspecified drug &/or medicine'
- E950.6 'Agricultural chemicals'
- E950.7 'Corrosive & caustic substances'
- E950.8 'Arsenic'
- E950.9 'Other & unspecified solids & liquids'

E951 Suicide and self inflicted poisoning by gases in domestic use

- E951.0 'Poison-gas through pipeline'
- E951.1 'Poison-liquid petrol gas'
- E951.8 'Poison-other utility gas'

E952 Suicide and self inflicted poisoning by other gases and vapours

- E952.0 'Poison-motor vehicle exhaust'
- E952.1 'Poison-other carbon monoxide'
- E952.8 'Poison-other specified gases & vapours'
- E952.9 'Poison-unspecified gases & vapours'

E953 Suicide and self inflicted injury by hanging, strangulation and suffocation

- E953.0 'Hanging'
- E953.1 'Suffocation by plastic bag'
- E953.8 'Hanging, suffocation-other specified means'
- E953.9 'Hanging, suffocation-unspecified means'

E954 Suicide and self inflicted injury by submersion (drowning)

- E954.0 'Suicide by submersion, drowning'

E955 Suicide and self inflicted injury by firearms and explosives

- E955.0 'Hand gun (pistol) (revolver)'
- E955.1 'Shotgun (automatic)'
- E955.2 'Rifle (hunting)'
- E955.3 'Military firearms'
- E955.4 'Other and unspecified firearm'
- E955.5 'Explosives'
- E955.9 'Unspecified'

E956 Suicide and self inflicted injury by cutting and piercing instrument

- E956.0 'Suicide by cutting or piercing instrument'

E957 Suicide and self inflicted injury by jumping from high place

- E957.0 'Jumping from high place-residential'
- E957.1 'Jumping from other man made structures'
- E957.2 'Jumping from natural sites'
- E957.9 'Jumping-unspecified'

E958 ***Suicide and self inflicted injury by other and unspecified means***

E958.0 'Jumping before moving object, train, vehicle'

E958.1 'Fire, burns'

E958.2 'Scald'

E958.3 'Extreme cold'

E958.4 'Electrocution'

E958.5 'Crashing of motor vehicle'

E958.6 'Crashing of aircraft'

E958.7 'Caustic substance, except poison'

E958.8 'Other specified means'

E958.9 'Unspecified means'

E959 ***Late effects of self inflicted injury***

E959.0 'Late effects of suicide'.

(World Health Organisation, 1986)

Appendix C

Health Zone Boundaries in Western Australia (1997)

Metropolitan zones

Health Zone	Health Service	Local Government Area
North Metro	Lower North Metro Wanneroo	Cottesloe, Mosman Park, Nedlands, Peppermint Grove, Stirling-Coastal, Stirling-Central, Subiaco Wanneroo
East Metro	Inner City Kalamunda Swan	Perth-Inner, Perth-remainder, Vincent, Stirling-South Eastern Kalamunda Bayswater, Mundaring, Swan, Bassendean
South East Metro	Armadale-Kelmscott Bentley	Canning (57%), Gosnells, Serpentine-Jarrahdale, Armadale Canning (43%), South Perth, Belmont, Shepparton
South West Metro	Fremantle Rockingham-Kwinana Peel	Fremantle, East Fremantle, Melville, Cockburn Kwinana, Rockingham Mandurah, Murray, Waroona

Rural zones

Health Zone	Health Service	Local Government Area
Midwest	Gascoyne Geraldton Midwest Murchison	Exmouth, Shark Bay, Upper Gascoyne, Carnarvon Greenough, Geraldton Chapman Valley, Coorow, Irwin, Mingenew, Morawa, Mullewa, Murchison, Northampton, Perenjori, Three Springs, Carnamah Meekatharra, Mount Magnet, Sandstone, Yalgoo, Cue
Midlands	Avon Central Wheatbelt Eastern Wheatbelt Western	Northam Shire, Toodyay, York, Northam Town Bruce Rock, Corrigin, Cunderdin, Quairading, Tammin, Beverley Kondinin, Koorda, Merredin, Mount Marshall- Shire, Mukinbudin, Narembreen, Nungarin, Trayning, Westonia, Wyalkatchem, Yilgam, Kellerberrin Dalwallinu, Dandaragin, Dowerin, Gingin, Goomalling, Moora, Victoria Plains, Wongan-Balidu, Chittering
Great Southern	Central Great Southern Lower Great Southern Upper Great Southern	Gnowangerup, Katanning, Kent, Kojonup, Tambellup, Woodanilling, Broomehill Cranbrook, Denmark, Jerramungup, Plantagenet, Albany Town, Albany Shire Brookton, Cuballing, Dumbleung, Kulin, Lake Grace, Narrogin town and shire, Pingelly, Wagin, Wandering, West Arthur, Wickepin, Williams, Boddington
South West	Bunbury Harvey-Yarloop Vasse-Leeuwin Warren-Blackwood Wellington	Capel, Dardanup, Bunbury Harvey Busselton, Augusta-Margaret River Bridgetown-Greenbushes, Manjimup, Nannup, Boyup Brook Donnybrook-Balingup

Remote zones

Health Zone	Health Service	Local Government Area
Kimberley	East Kimberley West Kimberley	Wyndham-East Kimberley, Halls Creek Derby-West Kimberley, Broome, Fitzroy
Pilbara	East Pilbara West Pilbara	Port Headland, East Pilbara Roebourne, Ashburton
Goldfields	Northern Goldfields South East Coastal	Kalgoorlie/Boulder, Laverton, Leonora, Menzies, Wiluna, Coolgardie, Ngaanyatjarrku Esperance, Ravensthorpe, Dundas

(Codde, Roberts, & Gill, 1997)

Appendix D

List of references for risk and protective factors table (Table 11)

- (Brent, 1995)
- (Cahill, 2000)
- (Commonwealth Department of Health and Aged Care, 1999)
- (Forman & Kalafat, 1998)
- (Hawkins, Catalano, & Miller, 1992)
- (Hillman, Silburn, Zubrick, & Nguyen, 2000)
- (Murphy, 2000)
- (National Institute on Drug Abuse, 1997)
- (Resnick et al., 1997)
- (Silbereisen, Robins, & Rutter, 1995)
- (Wagner, 1997)

Appendix E: Preventative Programs – Expanded Synopsis

Universal Programs

Midwestern Prevention Project/Project Star

Country of origin	USA
Aim	Substance-use prevention
Target group	School aged children from year 7 to high school; parents also encouraged to participate by working with children outside of school
Risk factors addressed	<ul style="list-style-type: none"> - availability of drugs - community laws and norms favourable to drug use - friends who engage in problem behaviour - favourable attitudes toward drug use
Protective factors addressed	<ul style="list-style-type: none"> - bonding to family - recognition - skills - healthy beliefs <ul style="list-style-type: none"> - clear standards -

Implementation

The program is implemented over a five-year period beginning in seventh grade and continuing into high school. The five components are introduced sequentially, with a new component introduced each year:

- The mass media component is used throughout the intervention period.
- The school-based program, using an integrated social influence curriculum is taught over 13 lessons in the first year, followed by a five-lesson booster curriculum in the second year.
- Parent education is comprised of two 2-hour training sessions to develop parents' skills for effective communication, substance use resistance skills, and other techniques to support their children's substance-free behaviours.
- The community organisation component supports volunteers and leaders from all sectors of the community, as well as overseeing the implementation and maintenance of the program.
- The health policy change component is the mechanism used to develop and implement local health policies that affect drug, alcohol and tobacco laws

Project Northland

Country of origin	USA
Aim	Prevention and reduction of alcohol use
Target group	School aged young adolescents (11-14 years)
Risk factors addressed	<ul style="list-style-type: none">- friends who use drugs- favourable attitudes toward drug use- early initiation of problem behaviour- availability of drugs- community laws- norms favourable toward drug use
Protective factors addressed	<ul style="list-style-type: none">- bonding to school- skills- healthy beliefs and clear standards

Implementation

The program consists of social-behavioural curricula in schools, peer leadership (designed to increase peer resistance and social competence skills), parental involvement/education (to provide parental support and modelling), and community wide-task force activities (designed to change the larger environment). Specific interventions include:

- The community-wide task force comprised of representatives from the community, addressed alcohol related ordinances and focused on promoting collaboration and linkages among community organisations and services providers.
- 6th Grade Slick Tray Home Team Program which consisted of four sessions of activity-story books – for class room work and homework to be completed with parents. Other components included: Northland Notes for Parents, Family Fun Night and a poster contest.
- 7th Grade Amazing Alternative Program which included a kick off evening with parents, an 8-week peer-led classroom curriculum, teen-led alternative activities programs, booklets mailed to parents and Northland Notes to Parents.
- 8th Grade Powerlines an 8-session classroom curriculum, a theatre production called 'Its My Party', and Northland Notes to Parents.

Woodrock Youth Development Project

Country of origin	USA
Aim	Prevention of drug and alcohol use
Target group	School based program for 6-14 year olds
Risk factors addressed	<ul style="list-style-type: none"> - favourable attitudes to problem behaviour - availability of drugs - friends who engage in problem behaviour
Protective factors addressed	<ul style="list-style-type: none"> - opportunities - skills - bonding - health beliefs - clear standards

Implementation

Components and domains of the program included:

- Human relation's classes, peer mentoring, extracurricular school activities, and structured teacher-student interactions. These classes were designed to enhance positive self-perceptions and to raise awareness of the dangers of alcohol, tobacco, and drug, as well as to contribute to the appreciation of other ethnic and cultural traditions.
- The school based domain involved regular meetings between youth advocates and teachers to help monitor progress and development goals.
- The family domain involved support through home visits designed to build communication and parental trust in the program; also included were parenting classes that covered family communication, in addition to the parent-school relationship.
- The community domain focused on developing a strong anti-drug message

Life-Skills Training Program

Country of origin	USA
Aim	Substance use prevention
Target group	School based, young adolescents (11-14 years)
Risk factors addressed	- friends who engage in the problem behaviour - favourable attitudes toward the problem behaviour
Protective factors addressed	- healthy beliefs and clear standards for social behaviour - - personal and social skills

Implementation

The program is a multi-component (four) substance use prevention curriculum addressing social, psychological, cognitive, and attitudinal behaviours that have been shown to be associated with the use of various legal and illegal substances:

- The problem specific component (four sessions) provides information on the consequences of substance use, drug prevalence rates, norms, the decreasing social acceptability of substance use, the stages of drug use, the physiological effects of drugs, and advertising strategies for promoting drugs (cigarettes and alcohol).
- The personal skills and well-being part teaches skills related to decision-making and media influences. Two sessions are aimed at self improvement and self-image, and two sessions are aimed at coping with anxiety.
- The social skills and interpersonal competence component is over six sessions, and teaches verbal and nonverbal communication skills; general social skills to reduce shyness, including necessary skills for making social contacts and basic conversational skills with same and opposite sex peers; and assertiveness skills training, including the difference between aggression and assertiveness, verbal and nonverbal assertiveness skills, and how to apply the skills to situations characterised by peer pressure to use drugs.
- A ten session booster curriculum was provided to reinforce the prevention curriculum the year following the intervention – students in the ninth grade also received a five session curriculum

Adolescent Alcohol Prevention Trial

Country of origin	USA
Aim	Substance use prevention
Target group	School children aged 6-10 years
Risk factors addressed	- favourable attitudes toward the problem behaviour - early initiation of the problem behaviour
Protective factors addressed	- healthy beliefs and clear standards

Implementation

The program had two combined approaches to it:

- The Normative Education approach was used to establish beliefs in conventional norms among students. It also taught students that the prevalence of substance use among their peers was lower than they might expect and that substance use was generally not approved of by their peers.
- Resistance Skills Training was used to build resistance to peer and other forms of social pressure. Student were taught a variety of techniques for identifying and resisting social pressure, including skills for being assertive in peer interactions, and practice these skills through role play scenarios.

The programs were delivered to students in seventh grade classes, with a brief follow-up the following year.

Communities That Care

Country of origin	USA
Aim	Prevention of adolescent problem behaviours
Target group	All youth and young adults within the community
Risk factors addressed	- low neighbourhood attachment and community disorganisation - transitions and mobility
Protective factors addressed	- healthy beliefs and clear standards for behaviour - opportunities to contribute to the community - skills for successful contribution - recognition for pro-social involvement

Implementation

This is an operational framework, providing an effective process for mobilising communities to promote healthy youth development. It aims to improve:

- interagency collaboration;
- reduction in the duplication of services;
- coordinated allocation of resources;
- increased leveraging of resources for prevention programming;
- targeting of prevention activities to priority risk and protective factors, resulting in a more strategic approach;
- increased use of research-based ‘promising approaches’ that have demonstrated effectiveness; and
- increased involvement of professionals, citizens and youth in community prevention activities.

Community/school policies

Country of origin	USA
Aim	Prevention and a reduction of irresponsible use of alcohol
Target group	All youth and young adults in the community
Risk factors addressed	- lenient community attitudes to the sale and consumption of alcohol
Protective factors addressed	- healthy beliefs and clear standards for behaviour - opportunities to contribute to policy making and/or monitoring - skills for policy making - recognition for policy development

Implementation

These are general policies which have demonstrated effectiveness in reducing the illegal and irresponsible use of alcohol:

- The regulation of availability, including minimum age requirements and few alcohol retail outlets located near schools for example.
- Taxation leading to increase in the overall cost of purchasing alcohol.
- Responsible beverage service which includes not selling alcohol to people under the legal age limit.

Problem Solving for Life Project

Country of origin	Australia (QLD)
Aim	To teach a range of cognitive skills, including helpful thinking and positive problem solving
Target group	Year 8 school children (12-13 years of age)
Risk factors addressed	<ul style="list-style-type: none">- depression- unhelpful thinking- lack of problem solving skills
Protective factors addressed	<ul style="list-style-type: none">- helpful thinking strategies- positive problem solving

Implementation

The program consists of eight sessions delivered over eight weeks during a school term, by trained teachers.

Reach Out

Country of Origin	Australia (NSW)
Aim	To reduce self-harm and suicide, and to promote social change and advocacy
Target group	Youth aged 15-24 (primarily Australian, but the Internet has international reach), professionals affected by youth suicide issues, and family and friends of youth
Risk factors addressed	<ul style="list-style-type: none">- negative behavioural intentions- negative self-efficacy- suicidal ideation- bullying- drug use
Protective factors addressed	<ul style="list-style-type: none">- positive help seeking behaviour- positive coping skills

Implementation

This is an internet based program, and because the internet is interactive, dynamic and socially acceptable to youth, the 'cool' nature of this medium is an integral part of the prevention strategy. It utilised the web for:

- Reaching youth, professionals, family and friends.
- Engaging them in help seeking behaviour.
- Increasing coping skills and ultimately negative behavioural intentions.

Living with Teenagers

Country of origin	Australia (NSW)
Aim	To enhance quality of life and build family strengths
Target group	Parents of teenagers
Risk factors addressed	<ul style="list-style-type: none">- poor parenting- little/no coping skills- communication issues
Protective factors addressed	<ul style="list-style-type: none">- positive parenting skills- confidence- positive coping strategies

Implementation

The program is based on an internal structure of modules which address specific developmental ages of children. Community groups are invited to 'host' the program's groups which are interactive and strive to empower parents around what they know and can share with other parents → creating social networks. Each group is 5-6 weeks with weekly sessions lasting 2-2.5 hours.

Mental Health Promotion

Country of origin	Australia (VIC)
Aim	To educate workers, parents and the community about young people's mental health problems
Target group	School teachers and youth service officers dealing with affected youth
Risk factors addressed	- negative attitudes and perceptions of mental illness
Protective factors addressed	- education

Implementation

The program offers regular professional development seminars for health and welfare professionals on clinical issues – specifically to increase the likelihood of referral to support services before major disturbances develop; and working with schools and youth groups to introduce a prevention focus to young people's thinking.

Drug Education

Country of origin	Australia (QLD)
Aim	Public education of drug use issues
Target group	Parents and the general public
Risk factors addressed	- behaviours associated with drug use
Protective factors addressed	- negative consequences of drug use

Implementation

The program, conducted in community centres, comprises of once a week meetings, lasting three hours for five weeks. It raises drug awareness, gives knowledge, improves self-awareness, establishes attitude changes, helps both decision making and behavioural change, and promotes social change.

Make a Noise

Country of origin	Australia (NSW)
Aim	To reduce self-harm and suicide, and to promote social change and advocacy
Target group	Youth under 25 years of age (primarily Australian, but Internet has international reach)
Risk factors addressed	<ul style="list-style-type: none"> - stress and pressure - favourable attitudes to drug use - hazardous sexual behaviours - unemployment
Protective factors addressed	<ul style="list-style-type: none"> - promotion of healthy mind and bodies - study skills - safe-sex practices - budgeting - finding a job - travelling overseas

Implementation

This is an internet based program, and because the internet is interactive, dynamic and socially acceptable to youth, the 'cool' nature of this medium is an integral part of the prevention strategy. It utilised the web for:

- Reaching youth, family and friends.
- Engaging them in help seeking behaviour.
- Increasing coping skills and ultimately negative behavioural intentions.

School Drug Education Project

Country of origin	Australia (WA)
Aim	Best Practice in School Drug Education (Harm reduction)
Target group	School aged children from kindy to year 12
Risk factors addressed	- positive attitudes to drug use
Protective factors addressed	- drug education - decision making - health promotion

Implementation

The program, based on the twelve best practice principals is taught to teachers, and has initiatives for involving parents as well. It is incorporated into the current curriculum within schools, and is divided into four phases:

- Kindy to year 3.
- Years 3 to 7.
- Years 7 to 10.
- Years 10 to 12.

All the phases entail:

- Planning for drug education.
- Activities.
- Monitoring student progress.
- Teaching strategies (role play; project, posters).
- Background Notes (extra information).

Youth Suicide Prevention – A Parent’s Guide (Scout Association of Australia)

Country of origin	Australia (VIC)
Aim	Prevention of youth suicide
Target group	Parents of adolescents and young adults
Risk factors addressed	<ul style="list-style-type: none"> - previous attempts - depression - drug and alcohol use - conduct disorders - disruptive and unsupportive family background - relationship conflicts - poor coping skills - psychiatric illness - availability of the means to commit suicide
Protective factors addressed	<ul style="list-style-type: none"> - presence of an important person in youth’s life - good coping skills - supportive and caring family environment - promotion of interests and other activities

Implementation

The program is based on a pamphlet which points out several strategies that parents can use to help prevent suicide. These include:

- forming good relationships with youth by providing:
 - providing a stable, safe physical and emotional home environment
 - spending quality time with young people
 - listening to teenagers, not only to what is being said, but also to the covert messages
 - being supportive and not intrusive
 - encouraging the appropriate expression of emotions
- strategies for early intervention in stressful situations
- taking suicidal threats seriously
- the early detection and management of psychiatric illness
- appropriate intervention after a suicide attempt
- being vigilant of changes in behaviour
- seeking advice or help from professionals if in doubt
- removing firearms or unnecessary medicines from home

The pamphlet also provides a list of centres which administer Child and Adolescent Psychiatry Services around Australia

Gatekeeper Training

Country of origin	Australia (WA)
Aim	Suicide prevention
Target group	Professionals and community members
Risk factors addressed	- warning signs - depression - risk assessment.
Protective factors addressed	- resiliency - referral - community response - postvention

Implementation

The two day program is offered through the Western Australian (WA) Youth Suicide Advisory Committee in conjunction with the WA Department of Health and the Education Department of WA and forms a major part of WA's youth suicide prevention strategy. The content includes:

- Background and contextual information
- Understanding of youth suicide
- Warning signs
- Depression
- Risk assessment and intervention
- Referral and other agencies
- Postvention
- Community response

The workshop provides participants with a mix of skills and knowledge relevant to youth suicide prevention along with an opportunity to practice and improve their intervention and assessment skills. More recently a train the trainer program was offered which has resulted in the accreditation of 50 regional trainers across WA. An important component of the training strategy has been the focus on developing strong interagency links across the health, education and youth affairs sectors to improve the delivery of services to young people at risk of suicide.

Preparing for the Drug Free Years

Country of origin	USA
Aim	Protection from substance use
Target group	Parents of Children aged 9 to 14 years
Risk factors addressed	<ul style="list-style-type: none"> - antisocial behaviour - below average academic skills - poor social skills - positive attitudes of others to drug use
Protective factors addressed	<ul style="list-style-type: none"> - strengthening of family bonds - positive study skills - bonding with pro-social others

Implementation

The program is based upon the Hawkins and Catalano social development strategy that increases protective factors and that exist in families. It does this by:

- creating opportunities for children to be involved in meaningful ways with their family;
- strengthening family bonds;
- setting clear expectations for their children's behaviours;
- teaching their children skills to resist peer pressure;
- reducing family conflict and controlling emotions; and
- practicing consistent family management.

The program is of a multi-media format utilising video segments, workbook exercises and guided discussions, in both a five-session and a ten-session format. The latter is designed to reach parents in one-hour sessions during their work day.

Live the Future

Country of origin	Australia (NSW)
Aim	To provide a model of best practice dissemination of health information through libraries (specifically alcohol and other drugs)
Target group	Young people aged 11-16 years, and their parents
Risk factors addressed	- lack of awareness surrounding drugs and alcohol
Protective factors addressed	- information about alcohol and other drugs in a variety of formats - appealing to young people - positive peer modelling - harm minimisation techniques

Implementation

The program aim was to increase community accessibility to current and accurate information about alcohol and other drugs. The program itself is a multi-media kit regarding the prevention of alcohol and other drug use. Each kit contains videos, comics, books and reference material relevant to young people. The information was accessible through local libraries.

Positive Parenting Program

Country of origin	Australia (QLD, WA)
Aim	To family health by enhancing parents' knowledge, skills and confidence
Target group	Parents of children exhibiting problem behaviours at a young age (preadolescence)
Risk factors addressed	<ul style="list-style-type: none"> - child abuse - mental illness - behavioural problems - delinquency - homelessness
Protective factors addressed	<ul style="list-style-type: none"> - competencies in young children - protective and nurturing environments for children

Implementation

Based on the QLD PPP program developed by Dr Saunders, Triple P is a unique, multilevel family intervention program. There are 5 levels of intervention:

1. Universal Triple P – A media-based parent information campaign targeted at all parents interested in information about parenting and promoting their child's development. This is a coordinated information campaign using print and electronic media and other health promotion strategies to promote awareness of parenting issues and normalise participation in parenting programs such as Triple P.
2. Selected Triple P – A brief selected intervention for parents concerned about their child's development or behaviour. This involves the provision of advice on how to solve common childhood developmental issues and minor child behavioural problems. It may involve face-to-face or telephone contact with a practitioner (about 20 minutes over 2 sessions) or seminars (60-90 minutes).
3. Primary Care Triple P – A narrow focus parent training for parents with specific concerns who require consultations or active skills training. This is a brief program (about 80 minutes over 4 sessions) combining advice with rehearsal and self-evaluation as required to teach parents to manage a discrete child behaviour problem.
4. All three of the above combined – Broad focused parent training for parents requiring intensive training in positive parenting skills, typically with children who have severe behaviour problems. This program is up to 12, 1 hour sessions, and may be individual, group, or self directed (with or without telephone assistance).
5. Enhanced Triple P – Behavioural family intervention for parents with child behaviour problems and family dysfunction such as parental depression or stress, or conflict between parents. This is an intensive individually tailored program (up to 11, 60-90 minute sessions). The program modules include home visits to enhance parenting skills, mood management strategies and stress coping skills, and partner support skills.

Programs for Parenting

Country of origin	Australia (VIC)
Aim	To enhance parenting skills and emotional competencies within families
Target group	Parents in the community
Risk factors addressed	<ul style="list-style-type: none">- low self-esteem in children- pessimistic attitudes of parents and children- violent solutions to problem solving
Protective factors addressed	<ul style="list-style-type: none">- positive parent child relationships- open communication between parents and children- optimism and hope

Implementation

The program is implemented by Anglicare and Centacare agencies, over two information sessions and two eight-week sequential sessions.

Youth Pack (The Samaritans)

Country of origin	England
Aim	To introduce young people to a range of issues that affect emotional health (suicide prevention)
Target group	Teachers and others in their work with young people
Risk factors addressed	<ul style="list-style-type: none"> - suicide - self harm - depression - stress - anxiety - fear
Protective factors addressed	- emotional health and well being

Implementation

The program broadens the group's understanding of the emotional issue and contains activities to facilitate understanding. Activities may be creative writing, creative art, group discussions and comprehension exercises. The pack includes instructions as to how the activities might be carried out, and a resource list to assist preparation. The focus of the program is on three broad facets:

- Factors that might lead to the development of the identified emotional issue. An activity is included on this along with instructions and a resource list.
- Encouragement of a greater awareness of how an individual might react if they personally experience this type of emotional distress. It aims to raise the group's awareness of signs which indicate an individual's emotional wellbeing may be at risk.
- Looks at what might be done to help and support an individual who is experiencing emotional distress.

These are incorporated into school curriculum.

Resilient Kids

Country of origin	Australia (VIC)
Aim	Suicide prevention
Target group	Teachers of primary and secondary school children
Risk factors addressed	- depression - suicide ideation
Protective factors addressed	- effective cognitive processing - high self-esteem - sense of belonging in school environment - clear and effective communication skills

Implementation

The program combines traditional classroom practice with the most current and interactive education medium of CD-ROM in order to maximise learning outcomes through teacher-led class discussion and student worksheets, and complementary interactive computer-based activities for individuals or groups. Key learning concepts include:

- identifying and understanding feelings;
- re-framing our automatic thoughts;
- de-catastrophising by seeing bad events as temporary and specific rather than permanent and global; and
- developing social and problem solving skills.

Selective programs

Resourceful Adolescent Program

Country of origin	Australia (NT)
Aim	To teach explicit skills to improve resilience to depression
Target group	Young adolescents in year 7 (12-13 years of age)
Risk factors addressed	<ul style="list-style-type: none">- depression- communication issues
Protective factors addressed	<ul style="list-style-type: none">- network building – communication, friendship- understanding personal strengths- understanding interrelationships between body sensations, thoughts, feelings and behaviours- employing critical judgements around negative self statements

Implementation

The basis of the program is cognitive behaviour therapy and interpersonal therapy. The program is five weeks of double sessions a week or ten weeks of single sessions, lasting for two hours.

Promoting Optimism WA

Country of origin	Australia (WA)
Aim	Early intervention and prevention for children at risk of mental health problems, especially depression
Target group	Year 7 students at risk for developing depression
Risk factors addressed	<ul style="list-style-type: none">- having previous history of depression earlier in life- pessimistic attribution problems- cognitive errors- negative self perceptions- poor social skills- negative parent-child interaction patterns
Protective factors addressed	<ul style="list-style-type: none">- positive coping and problem solving skills- positive self image and self esteem

Implementation

The program consists of twelve, two hour weekly sessions. The first half of the program involves cognitive restructuring and disputation: challenging negative thoughts, practicing more optimistic, realist thinking, looking for evidence, evaluating thoughts; de-catastrophising, then applying these techniques to interpersonal conflict. The second half focuses on social skills: assertiveness and negotiation, coping strategies (e.g. relaxation) graded task training, decision making and problem solving. Games, role plays, skits, worksheets and discussion are used to develop these concepts.

Mental Health Early Prevention Service

Country of origin	Australia (NSW)
Aim	Identifies and targets at-risk youth (NESB, drug users, parents with mental illness, young refugees etc.)
Target group	Adolescents and young adults (13-24 years of age)
Risk factors addressed	<ul style="list-style-type: none">- negative coping strategies- anxiety disorders
Protective factors addressed	<ul style="list-style-type: none">- early intervention through psycho-education- resilience to adverse social situations- clear pathways for referrals and specialist care

Implementation

Program utilised NESB early intervention strategy. It develops individual care coordination plans in partnership with patients, families and advocates. The length of the program may be twelve months to two years, with session of 45 minutes twice a week.

Project Hahn

Country of origin	Australia (TAS)
Aim	Program focuses on supporting young people at risk or disadvantaged due to personal circumstances, location and economic conditions
Target group	Any young person between 15 to 25 years
Risk factors addressed	- isolation - socioeconomic disadvantage - unconstructive lifestyles
Protective factors addressed	- peer-mentoring - self-reflection - collaboration with others

Implementation

Based the on Outward Bound program, and five and a half days in duration, the program has four interdependent areas:

- the training of peer support people to provide primary prevention and early intervention support;
- development of peer support processes in schools and in the community for young people who are at risk of personal harm and/or exhibit personal identity crises;
- improved coordination of government and non-government youth services in response to the identified needs of young people and the requirements of locations where existing services are limited; and
- extension to young people at risk of self harm, of support processes developed through wilderness based psycho-social therapy programs.

Barnardos – ‘Streetwork Project’

Country of origin	Australia (NSW)
Aim	Adolescents and young adults at risk of drug use
Target group	Youth aged between 12 and 20 in the community
Risk factors addressed	- favourable attitudes to problem behaviours - alienation - low neighbourhood attachment and community disorganisation
Protective factors addressed	- harm minimisation - education about risk involved in use behaviours - alternative activities to risk behaviours offered

Implementation

Contact is made with alienated young people through workers meeting them at pool halls, cafes and streets. Assistance is then offered as problems are defined with the individual. Services offered include:

- information provision
- resource provision
- assessment
- referral
- crisis intervention
- brief intervention
- informal counselling
- lobbying
- workshops
- recreational activities

The program also runs camps, excursions and workshops.

Personal Growth Class

Country of origin	USA
Aim	Prevent high-risk behaviours
Target group	At risk youth identified as being potential drop outs from high school
Risk factors addressed	- low self-esteem - lack of personal control
Protective factors addressed	- communication skills - interpersonal skills

Implementation

Daily, 55-minute sessions in normal class time, over one semester (90 classes in total). It involves a comprehensive psycho-educational model that also has a peer support module. Particularly targets the at risk behaviours of school dropout, drug use, depression and suicide risk. Teaches life-skills training (enhancing protective factors, resilience, decision making, self-esteem, personal control and interpersonal communication and has an anti drug message throughout..

Coping and Support Training Model

Country of origin	USA
Aim	to decrease suicidal behaviours, depression, drug involvement and increase school performance
Target group	At risk high school students
Risk factors addressed	<ul style="list-style-type: none">- negative peer pressure- stress- depression
Protective factors addressed	<ul style="list-style-type: none">- life skills development- mood management- drug use control

Implementation

School based program, groups of one leader to six to ten students. 12 sessions comprising orientation, group support, self esteem, decision making, anger management, school smarts, drug use control and staying on track.

Dare To Be You

Country of origin	USA
Aim	Improve self concept, satisfaction and skills with parenting, build child-parent relationships, improve child's resiliency skills
Target group	Pre-school children and their families at risk of drug use
Risk factors addressed	- inadequate life skills, inadequate parenting skills
Protective factors addressed	- self worth - self responsibility - communication skills - problem solving skills - reasoning skills

Implementation

- Provide two series of 10-12 workshops for families (2&1/2 hours in length) with a meal, parent child activity and separate activities for child and parents.
- Provide annual reinforcement workshops for parents.
- Provide monthly support groups.
- Offer preschool teacher and day care training workshops.
- Train community volunteers to offer continuing to support families.

Across Ages

Country of origin	USA
Aim	Substance use prevention
Target group	Young school children aged 10-13 years and their families
Risk factors addressed	- unsupportive home environment - truancy and poor academic performance
Protective factors addressed	- positive, nurturing role models - engaging in community service activities - competent life skills, problem solving skills, and resistance skills

Implementation

Implementing the program involves:

- Elders (55 years or older) mentoring youth.
- Youth performing community services eg. visiting nursing homes, helping in soup kitchens etc.
- Youth learning problem-solving and resistance skills in the classroom.
- Parental involvement in the form of homework projects and extra curricular activities.

Strengthening Families Program

Country of origin	USA
Aim	To improve the parenting skills of parents who are substance abusers
Target group	Parents (substance users)and their children aged 6-10 years
Risk factors addressed	<ul style="list-style-type: none">- family history of substance use- favourable attitudes towards drug use- early antisocial behaviour- family management problems
Protective factors addressed	<ul style="list-style-type: none">- healthy beliefs and clear standards- bonding- skill development- recognition

Implementation

This is a family focused, multi-component program that has three distinct elements; parent raining, children’s skills training, and family skills training. Conducted in 14 weekly sessions.

Focus on Families

Country of origin	USA
Aim	To improve the parenting skills of parents who are methadone users and to reduce the use of illegal drugs
Target group	Parents (methadone users) and their children
Risk factors addressed	<ul style="list-style-type: none">- ineffective family management- illegal drug use- family expectations about drugs
Protective factors addressed	<ul style="list-style-type: none">- problem solving- favourable parental attitudes- relapse prevention- enhancing parenting skills- children refusing drugs/attitudes to

Implementation

Begins with a 5 hour family retreat and follows up with 32 parent training session of which children attend 12. Topics include; family communication, goal setting and problem solving.

Child Development Project

Country of origin	USA
Aim	To increase and enhance the social, behavioural and academic competence of students
Target group	Year 6 students (aged 11-12 years) and their parents
Risk factors addressed	<ul style="list-style-type: none">- low self-esteem- negative parental and community influences- low school attendance- peer pressure
Protective factors addressed	<ul style="list-style-type: none">- social competence- behavioural competence- academic competence

Implementation

The program was designed to be implemented within the school system. There were 4 main components to the program:

- Students were matched with an elder mentor (55 years or older) and spent a minimum of 4 hours per week in one-to-one contact.
- Students were taught personal and social skills, with particular emphasis on helping to reduce peer pressure to experiment with alcohol and other drugs.
- Community service activities were offered, so that young people could have an opportunity to provide service to others and become involved in constructive activities outside of school.
- The bonds between parents and children were strengthened, and caregivers were assisted in developing more effective parenting styles through their involvement in the program.

Creating Lasting Connections

Country of origin	USA
Aim	Prevention of alcohol and other drug use
Target group	11-15 year old youths at high risk for alcohol and other drug use, and their families
Risk factors addressed	- ignorance regarding the issues surrounding alcohol and other drug use - poor communication skills
Protective factors addressed	- community engagement through religious settings - knowledge of available community services

Implementation

The program was designed to work with both community and family systems to identify youth and parents or guardians at high risk for substance use; increase familial resilience to and decrease risk for substance use; provide support services; and to mobilise communities to prevent substance use. The program was divided into seven steps:

- Identify, recruit, assess, and select church communities.
- Form and conduct orientation of church advocate teams.
- Train church advocates in an 8-10 week training session.
- Recruit families in high risk environments and hold family-oriented social activities.
- Train parents in relevant alcohol and other drug issues.
- Provide training to parents on family enhancement and management, including improving communication about, setting expectations for, and defining consequences for youth alcohol and other drug-related behaviour. The duration of this was 5-6 weeks for 2.5 hours per week.
- Offer training to parents and youth in constructive decision making. The duration of these sessions were 5-6 weeks for 1.5 hours per week.

Steps 5 to 7 could be conducted with both youth and parents, or separately, and could be conducted in consecutive models, or spread over a longer period throughout the year (usually 5 week increments)

Greater Alliance of Prevention Systems

Country of origin	USA
Aim	Reduction in community drug problems
Target group	Community leaders and youth at high risk for substance use
Risk factors addressed	- lack of connection to the community
Protective factors addressed	- life skills - effective coping skills - effective decision making, problem solving and communication skills

Implementation

The program provided:

- alternate activities to help youth learn about their culture;
- a social competence component on peer leadership groups for youth in high risk environments;
- educational groups for parents to learn about child development; and
- training a core of community leaders to develop and implement a community action plan to change both formal and informal policies in the community with the intent to limit the exposure to and availability of alcohol and other drugs in the community.

Residential Student Assistance Program

Country of origin	USA
Aim	Substance use and mental health problems, including attempted suicide
Target group	Institutionalised adolescent children of substance users who have committed violent or delinquent acts; have been physically, sexually, or psychologically abused; have chronic failure in school; and/or have experienced mental health problems
Risk factors addressed	- childhood abuse
Protective factors addressed	- peer resistance skills - positive self-image and self-worth - effective communication skills and interpersonal relationships

Implementation

The program provided individual and group prevention and intervention services within the residential facilities for the adolescents by:

- training residential facility staff and provide employee assistance programs for staff in need of them
- coordination of substance use prevention programs, services, and policies of the facilities
- drug assessment conducted for all new residents entering the facility
- referral and follow-up with residents needing substance use treatment out of the residential facility
- provision of outreach services to encourage self and peer referrals and to provide primary prevention services for non-users

The sessions involving residents lasted for 45 minutes each, and continued for the duration of their stay, at various times and days during the week.

Smart Leaders

Country of origin	USA
Aim	Prevention of substance use
Target group	'Boy-' and 'Girl-club' members between the ages of 13-17 at risk for substance use
Risk factors addressed	<ul style="list-style-type: none">- favourable attitudes toward substance use- favourable attitudes toward adolescent sexual activity
Protective factors addressed	<ul style="list-style-type: none">- increased knowledge about the prevalence and consequences of substance use and early sexual activity- effective social and communication skills- peer resistance skills

Implementation

The program is a 2 year sequential program consisting of five 1-1.5 hour sessions in year 1, and three sessions in year 2. The curriculum based program uses role-playing, group activities, and discussion to promote social skills, including peer resistance skills, problem solving and decision making skills, conservative group norms regarding substance use and early sexual activity, and knowledge of the consequences and prevalence of substance use and teen sexual activity

Family Advocacy Network (FAN Club)

Country of origin	USA
Aim	Prevention of substance use
Target group	Youth aged 11-13 and their parents
Risk factors addressed	- favourable attitudes toward substance use - favourable attitudes toward adolescent sexual activity - family isolation
Protective factors addressed	- increased knowledge about the prevalence and consequences of substance use and early sexual activity - effective social and communication skills - peer resistance skills

Implementation

When structured prevention programs are not being offered, the program offers monthly activities that stress non-drug-use norms to youth. Activities fall into four categories:

- basic support activities to help families cope with daily life or specific crises
- parent support in social settings
- educational program activities designed to provide education, knowledge, or enrichment experiences
- leadership activities in which parents took a major role in planning and implementing

Youth Program (Onslow)

Country of origin	Australia (WA)
Aim	Substance use prevention
Target group	Young people in the community
Risk factors addressed	- delinquent behaviour
Protective factors addressed	- self esteem - self worth

Implementation

The program comprises both structured and informal activities for youth, including camps. It links the school and shire with juvenile justice to provide a broad base of assistance for young people.

Reconnecting Youth Program

Country of origin	USA
Aim	To build resiliency to risk factors associated with substance use
Target group	Young people in schools from 9th-12th grade who show signs of poor school achievement.
Risk factors addressed	- problematic behaviour - depression - suicidal ideation
Protective factors addressed	- resiliency with respect to risk factors - moderation of early signs of substance use

Implementation

To enter the program, students must have poor school achievement, and high absenteeism. The program itself incorporates social support and life skills training including:

- Personal Growth Class – a semester long, daily class designed to enhance self-esteem, decision making, personal control and interpersonal communication.
- Social activities and Social Bonding – to establish drug-free social activities and friendships, as well as improving the teenager’s relationship to school
- School System Crisis Response Plan – for addressing suicide prevention approaches

Adolescent Transition Program

Country of origin	USA
Aim	Parenting practices for prevention of substance use
Target group	Parents of all students in school
Risk factors addressed	<ul style="list-style-type: none">- family dysfunction- problem behaviour of children- ineffective family management skills
Protective factors addressed	<ul style="list-style-type: none">- family cohesion- positive reinforcement- effective monitoring- limit setting

Implementation

Through collaboration with the school staff, the program engages parents, establishing norms for parenting practices, and disseminates information about risks for problem behaviour and substance use. A videotape “Parenting in the Teenage Years” helps parents identify observable risk factors and promotes protective factors.

The program also offers “Family Check-Up” - family assessment and professional support to identify those families at risk for problem behaviour and substance use, and further provides direct professional support to parents for making the changes indicated by the Family Check-Up. Services may include behavioural family therapy, parenting groups or case-management services.

Young People and Psychiatric Illness Intervention and Assessment Program

Country of origin	Australia (NSW)
Aim	Suicide Prevention
Target group	People aged between 14-20 years of age
Risk factors addressed	- suicide risk or attempted deliberate self-harm - serious mental illness (particularly psychosis and/or depression)
Protective factors addressed	- early intervention

Implementation

The program provides a community based assessment and crisis intervention for young people experiencing severe mental health issues and at risk for suicide. It acts as advocate to young people to negotiate their service needs with relevant agencies, and provides a holistic source model that will provide information for consumers and carers. This will assist with the collaboration and integration of service provision between Adult Mental Health, Youth Mental Health and Alcohol and Other Drugs.

Indicated programs

Substance Use and Mental Health Treatment Team

Country of origin	Australia (Vic)
Aim	To identify and treat people with the co-existing disorders of mental illness and substance use
Target group	All people aged between 16 and 65 years of age who have a serious mental illness and drug use issues
Risk factors addressed	- homelessness - co-existing disorders
Protective factors addressed	- education and training in area of 'dual diagnosis'

Implementation

The program is on going and has four major areas:

1. To establish a specialist dual diagnosis program that will:
 - promote service development
 - incorporate staff training
 - promote research
 - provide direct clinical services to clients who require the services of both Mental Health and Drug and Alcohol agencies
2. To upgrade skills across the mental health and drug and alcohol fields in supporting people with a dual diagnosis through the provision of training and education activities and secondary and tertiary consultation
3. To develop and test new integrated service provision models which will:
 - provide improved health outcomes for people with a dual diagnosis
 - include coordinated care strategies promoting the development of cooperative inter-service arrangements
 - develop mechanisms for maintaining support services building on existing systems and programs wherever possible and minimising the extent to which additional specialised dual diagnosis programs are developed
4. To enhance the effectiveness of both service systems in dealing with people who have a dual diagnosis by developing best practice wisdom and disseminating widely

Self Harm Social Workers

Country of origin	Australia (WA)
Aim	To reduce the rate of re-admission for suicide attempts amongst young people
Target group	Young people 13-24 years presenting to hospital with deliberate self harming behaviour
Risk factors addressed	- previous self-harm and possible suicide attempts - suicide ideation
Protective factors addressed	help seeking behaviours

Implementation

Every young person is seen and assessed by the self-harm social worker. Social worker then links the young person into appropriate community agencies and support services for continued treatment and follow up.

Next Step Specialist Drug and Alcohol Services

Country of origin	Australia (WA)
Aim	Youth drug prevention and treatment
Target group	Young people in the community aged 18-24 years
Risk factors addressed	<ul style="list-style-type: none">- high drug use, injecting drug use and drug overdoses- health problems, such as blood borne viruses infection and sexually transmitted diseases- depression, suicidal ideation and self harming behaviours- poor family and social supports- school non-attendance or unemployment- legal problems
Protective factors addressed	<ul style="list-style-type: none">- positive self esteem- problem solving

Implementation

To meet the needs of young people with the above risk factors, the following strategies are used at a youth clinic which has a waiting room, reception area, two counselling rooms, a doctors room, a treatment room and a group/meeting room:

- Assessment – a comprehensive medical, psychological and social assessment will be undertaken by the multi-disciplinary team
- Withdrawal – most clients will be encouraged to undertake drug withdrawal as outpatients under the supervision of the team medical officer and clinical nurse
- Pharmacotherapies is provided, and includes methadone, naltrexone and possibly buprenorphine in the future
- Individual and family counselling
- Shared care by a number of different health and welfare services
- Case management
- Parental support

LifeSPAN

Country of origin	Australia (VIC)
Aim	Reduce suicide risk
Target group	Young people with serious mental illness
Risk factors addressed	- mental illness
Protective factors addressed	- effective access to mental health services

Implementation

The program defines best practice in terms of mental health service treatment of young people with serious mental illness. It ensures that young person has a clear and clear and relevant strategy for obtaining assistance if the need to self-harm becomes overwhelming. Furthermore, assistance is offered to the young person to understand the psychological processes that lead to suicidal thoughts and acts and increasing their ability to identify the early warning signs of this occurring. These strategies may include problem solving, stress management and improved interpersonal skills.

Street Van Outreach Program

Country of origin	Australia (WA)
Aim	Suicide prevention
Target group	Young people
Risk factors addressed	<ul style="list-style-type: none">- homelessness- moral and/or physical danger- addiction to licit and illicit drugs
Protective factors addressed	<ul style="list-style-type: none">- information dissemination- emotional support

Implementation

The program operates primarily on Friday or Saturday evenings, and the overall hours are reviewed and amended to suit the needs of young people in the area of patrol. Volunteers work to build rapport with the young people, assist with immediate physical matters, provide information and referral assistance, arrange transport and organise emergency accommodation, and generally provide support.

Parenting Adolescents: A Creative Experience

Country of origin	Australia (VIC)
Aim	Enhance relationship between parents and adolescents
Target group	Parents of adolescents
Risk factors addressed	<ul style="list-style-type: none">- ineffective communication skills- inappropriate parenting styles
Protective factors addressed	<ul style="list-style-type: none">- awareness raising- conflict resolution skills- fostering a nurturing and authoritative parenting style

Implementation

The program is run over 10 sessions which cover, an introduction, listening, assertion, adolescent development, family, values-sexuality, drugs and lifestyles, conflict resolution, work and study, hope-issues of suicide, and future plans.

Appendix F: List of references and resources for preventative programs

<http://auseinet.flinders.edu.au/projects/>
<http://costello.cas.utk.edu/~chrg/hit/main/interventions.htm>
<http://sdep.wa.edu.au/>
<http://www.childsafe.net.au/SCOUTS/scysp1.htm>
<http://www.Colorado.EDU/cspv/blueprints/model/>
<http://www.drp.org/PDFY.htm>
<http://www.health.urg/hry/Programs/>
<http://www.libertynet.org/woodrock/page7.htm>
<http://www.nida.nih.gov/HSR/da-pre/KumpferLitReview.htm>
<http://www.nida.nih.gov/Prevention/PROGRM.html>
<http://www.opendoors.com.au>
<http://www.reachout.asn.au>
<http://ysp.org.au/>
(Australian Institute of Family Studies, 1999a)
(Australian Institute of Family Studies, 1999b)
(Brounstein & Zweig, 1999)
(Cahill, 2000)
(Davis, Martin, Kosky, & O'Hanlon, 1999)
(Fisher & Bowen, 1998)
(Patton & Burns, 1998)
(Posey, et al., 1996)
(Sanders, 1999)
(Tanti, 1998)
(Towers, 2000)