Australian Healthcare Associates

Appendix E

Appendix E – NSPP Stage 2 Literature Review

1 INTRODUCTION AND BACKGROUND

1.1 Evaluation of the National Suicide Prevention Program – literature review

The evaluation of the National Suicide Prevention Program (NSPP) has been informed by an in-depth literature review with two distinct stages. Stage one of the literature review sought to inform the development of a robust Evaluation Framework to be employed by the evaluation. To achieve this, all published articles relating to the evaluation of suicide prevention programs both in Australia and internationally were identified. The key aims of the Stage 1 Review were to:

1. Examine each of the evaluation frameworks and methodologies employed, in order to determine whether or not they could help to inform the development of a framework to be employed by the current evaluation
2. Identify the various quantitative and qualitative performance indicators that have been used to evaluate the effectiveness of programs, and could potentially be applied in the Australian context
3. Identify appropriate quantitative and qualitative tools that have been used to define and measure the impacts of suicide prevention activities that could be used in Australia
4. Identify key (Australian) stakeholders who may be able to contribute to the stakeholder consultation.

The conclusions from this component of the review highlighted that while the majority of national suicide prevention strategies identified set out a series of goals and/or objectives for action, for the most part they did not outline a clear framework for evaluation. A minority of strategies (or supporting action plans) included performance indicators or targets; some included specific sources of data for monitoring success against these indicators; some nominated the agency responsible for implementing each goal; and some included specified timelines for action. Only one included an economic evaluation. For some countries either independent evaluations or documents reporting on the progress of a strategy were available. However, the application of clear evaluation frameworks was rare.

The purpose of the second stage of the literature review was to enable conclusions to be drawn about the effectiveness of Australia's suicide prevention efforts to date, compared with other local and international efforts. Building on the information obtained in stage one, the stage two literature review was conducted to assist the evaluators in:

- Determining whether or not the approach taken in Australia reflects international best practice
- Examining how outcomes achieved in Australia compare to those reported elsewhere
- Identifying any gaps in systems of delivery and evaluation
- Highlighting possible improvements in the way suicide prevention activities are delivered and evaluated in Australia.

In particular, it examined and synthesised the evidence with regard to those groups at elevated risk of suicide and the effectiveness of specific suicide prevention interventions.

1.2 An overarching framework for suicide prevention strategies

In response to high suicide rates around the world, the United Nations (UN) published guidelines in 1996 that aimed to encourage and assist countries in developing national suicide prevention strategies.[1] Acknowledging that the pathways to suicide are often complex and multifaceted, the guidelines

recommended that strategies should adopt a range of approaches and activities, target their activities towards a range of at-risk groups, and that they should be based upon the best available evidence.

Many countries have since developed national approaches to suicide prevention based on these recommendations. The complexity of such multifaceted approaches and specific targeting of high risk groups can be conceptualised under the framework originally developed by Mrazek and Haggerty,[2] and later adapted by Silverman and Maris,[3] which classifies suicide prevention activities into 'universal', 'selective' and 'indicated' approaches.

Universal approaches target whole populations, with the aim of favourably shifting proximal and distal risk and protective factors across the entire population. Selective interventions target subgroups whose members are not yet manifesting suicidal behaviours, but exhibit risk factors that predispose them to do so in the future. Indicated interventions are designed for people who are identified as already beginning to exhibit suicidal thoughts or behaviours.

1.3 Australia's approach

Australia was one of the first countries to develop a national suicide prevention strategy.[4] This is operationalised through the LIFE Framework and supported by a national program of funded activity (the NSPP). Drawing upon the priorities set out in the LIFE Framework, and in line with the UN recommendations described above, this funding program is dedicated to both population wide (i.e. universal) and targeted (i.e. selective or indicated) suicide prevention activities, i.e. supporting broad population health approaches where proven effective, as well as targeted interventions directed towards groups identified as being at increased risk of suicide. In addition, the LIFE Framework highlights the importance of ongoing evaluation in order to ensure that the program of work is (as far as possible) evidence-based.

2 METHODS

Evidence pertaining to high-risk groups and interventions aimed at reducing suicide-related behavior was identified through a literature search. The Medline database was searched in September 2012 using the keywords 'suicid* AND (systematic OR meta-analysis)'. No date restrictions were placed on the search. In order to ensure that as many relevant articles as possible were found, reference lists of key articles identified by the search were examined, and publications by key authors in the area of suicide prevention were reviewed. Due to the scope of the project, only articles that systematically reviewed either groups at elevated risk of suicide or interventions designed to reduce suicide risk were included. Articles that reported on individual studies were not included.

Articles describing interventions in Australian Indigenous populations were identified separately, because there were likely to be much fewer trials specifically targeting these populations subjected to systematic review. For this information, Medline was searched more broadly, using the terms 'suicid* AND (Indigenous OR Aboriginal)' with additional hand searching. These search results were screened to identify studies that were conducted in Australia and reported on the effects of specific interventions.

Where possible, the findings are presented in an Australian context, supported by the most recent national mortality data reported by the Australian Bureau of Statistics.

3 RESULTS

One hundred and forty articles were retrieved by the search, of which 39 focused on those groups at elevated risk of suicide, and 41 reported on the effectiveness of specific interventions or approaches to suicide prevention. Three articles reported on individual studies of interventions in Indigenous populations.

A further 33 articles were identified through hand searching of references, and targeting key authors in the area of suicide prevention.

3.1 High-risk groups

This section summarises evidence obtained from the retrieved literature regarding those subgroups of the general population that are at elevated risk of suicide. It also considers high-risk groups that are specific to Australia.

3.1.1 Men

Suicide is one of the leading causes of death among men, both here in Australia and around the world. The most recent Australian data show that men account for three quarters of all deaths by suicide,[5] whilst in England suicide is the leading cause of death in men under 35 years.[6] Young men are at especially high risk, with suicide being the second-leading cause of mortality (behind accidental death) for this group around the world[7], and the greatest cause of premature mortality in Australia.

3.1.2 Youth

Internationally, youth suicide rates have gradually been increasing and young people are now at the highest risk of suicide in one third of all countries (both developed and developing).7 At least 100,000 adolescents die by suicide every year[8] and, worldwide, suicide ranks in the top five causes of mortality among 15 to 19 year olds.[9]

In Australia, the most recent data available demonstrate that suicide is the leading cause of death among Australians aged between 15 and 24, accounting for between 22% and 24% of all deaths in this age group5. In 2010 there were 113 suicide deaths among 15-19 year olds and 183 among those aged 20-24.[5]

3.1.3 Older adults

Suicide rates are highest amongst the elderly population according to the World Health Organisation8 (WHO), and in Australia, suicide rates in older adults are at a similar level to those of young people.[10] It has been suggested that the elderly are at risk of suicide due to a number of factors, including psychiatric illness (most notably depression), physical and functional impairment and the impact of stressful life events, including bereavement.[11]

3.1.4 Culturally and linguistically diverse (CALD) populations

People who were born overseas make up around 25% of all suicides in Australia each year.[4] Possible reasons for this may be that people from CALD communities do not seek help for mental health issues, or the information/support that is available may not be in their language. Furthermore, those who have experienced a traumatic event may be at higher risk for subsequent mental health issues such as depression or Post Traumatic Stress Disorder (PTSD) that in turn increase their risk of engaging in suicidal behavior.[12]

3.1.5 Indigenous populations

In Australia, the suicide rate in the Aboriginal and Torres Strait Islander population is over two times higher when compared with non-Indigenous Australians.[5] Between 2001 and 2010 there were 996 deaths by suicide among Indigenous Australians and although rates have been decreasing in recent years, suicide among Indigenous people remains disproportionately high relative to non-Indigenous Australians.[13] This is particularly notable in young people: in Indigenous children younger than 15 years, the suicide rate was more than seven times higher than their non-Indigenous peers, and in the 15-24 age group, Indigenous youth had a suicide rate 3.6 times higher than that for non-Indigenous youth.[14]

Recent research using the Queensland Suicide Register suggests that Indigenous people who have died by suicide were less likely to have sought treatment for a psychiatric condition or be diagnosed with depression compared with non-Indigenous individuals who have also died by suicide.[15] Other risk factors may be disproportionately high in Indigenous populations, including demographic isolation, substance abuse and imprisonment.[16]

3.1.6 Rural and remote populations

There is some evidence to suggest a higher rate of suicide in rural and remote areas, when compared to metropolitan areas, especially amongst men.[17,18] Potential explanations as to why this may be include greater access to firearms, lower socioeconomic circumstances, and higher levels of social isolation.[19]

3.1.7 People with mental illness

The relationship between mental illness and suicide is well established, with a systematic review of psychological autopsy studies estimating that 83% of suicide cases had a history of mental illness.[20] In terms of attempted suicide, evidence suggests that more than 50% of those who attempted suicide had a previous mental illness.[21] Suicide-related behavior is associated with a broad range of mental disorders, including major depressive disorder, bipolar disorder, anxiety disorders, schizophrenia, substance use disorders, anorexia nervosa, and borderline personality disorder.[22,23,24,25,26,27,28] Previous suicide-related behaviour has also been found to be a strong predictor of subsequent suicide-related behaviour in those admitted for inpatient psychiatric treatment.[29]

With regard to young people specifically, suicidal youth are six times more likely to have a psychiatric disorder compared with non-suicidal youth[30] and psychiatric issues present as early as eight years of age can be predictive of future suicidal behaviours.[31]

3.1.8 Those with substance-related disorders

The literature pertaining to both adults and adolescents indicates a strong association between substance misuse and suicide-related behavior,[32,33] showing that those who misuse substances and those with substance use disorders are more likely to attempt, and die by, suicide. A recent review of psychological autopsy studies estimated that between 15 and 61% of those who died by suicide suffered from a substance use disorders.[34] Additionally, substance use disorders commonly occur alongside mental illness (e.g. depression) and, given the link between mental illness and suicide risk, this further increases the risk.[35]

While the elevated risk of suicide in those who misuse substances is well established, the mechanisms that account for it are not. Likely explanations include proximal effects (e.g. effects of intoxication), distal effects (e.g. social isolation, family breakdowns) and common factors that predispose an individual to both substance misuse and suicide-related behaviour (e.g. mental illness).

3.1.9 People who have previously engaged in suicide-related behavior (including suicide attempt, suicidal ideation and deliberate self-harm)

People who have engaged in past suicide-related behavior are at significantly higher risk of future suicide-related behaviour, including death by suicide, even when other suicide risk factors are accounted for (e.g. mental illness, hopelessness).[36] For example, among those with a mood disorder, rates of completed suicide are higher in those with a previous suicide attempt when compared to those with no suicide attempt history.[37] While it is acknowledged that suicidal ideation does not necessarily translate into suicide attempt or completion, it does constitute a significant risk factor.[38]

Similarly, a previous episode of deliberate self-harm is an important risk factor for future suicide; those presenting to emergency departments for deliberate self-harm were significantly more likely to die by suicide than those in the general population, with suicide rates highest in the six months following the self-harm episode.[39]

3.1.10 People with physical illness

There is some evidence that people who are physically ill are at higher risk of suicide. For example, a systematic review by Catalan et al[40] suggests that there is a high prevalence of suicide-related behaviour in people with HIV. Harris and Barraclough also note a number of physical illnesses that have been associated with suicidal behaviour, including HIV/AIDS, certain types of cancer (head and neck), neurological diseases and some autoimmune diseases.

3.1.11 People bereaved by suicide

In terms of the risk of future suicidal behavior in those bereaved by suicide, a recent meta-analysis has found that children whose parents die by suicide are more likely to die by suicide themselves,[41] and the suicide of a spouse has also been shown to increase the risk of suicide in the surviving spouse.[42] Furthermore, those bereaved by suicide often exhibit higher rates of mental illness compared with those who have not been affected by suicide, which in turn elevates their risk for future suicide-related behaviour. For example, children of a parent who has died by suicide were found to have higher rates of alcohol and substance use, as well as depression, when compared with children whose parents had died of a sudden natural death.[43] Longitudinal research has also found that children bereaved by the

suicide of a parent demonstrate a greater number of anxiety symptoms during the first two years of bereavement compared with children whose parents died of other causes.[44] The loss of a relative to suicide can often elicit complex grief reactions, which include prolonged mourning, and increased depression and anxiety,[45] all of which may increase the risk of suicide in the future.

3.1.12 Prisoners

International data, while acknowledging variation between countries, indicate that rates of suicide among those incarcerated are at least three times higher than rates found in the general population.[46] In addition, those on forensic wards show the highest rates of attempted suicide, compared with other inpatient settings.[47]

Particularly vulnerable groups among prisoners include those with mental illness, history of substance abuse, suicidal ideation and history of suicide attempt.[48] Recent release from prison is also a risk factor associated with suicide; international and Australian data show that suicide rates among the recently released are higher than 'in prison' rates (possibly reflecting access to means) as well as general population rates. These studies also indicate a timing effect, where risk appears heightened in the time period directly following release.[49, 50]

3.1.13 Lesbian, gay, bisexual, transgender and intersex (LGBTI) populations

Reliable information regarding rates of suicide in LGBTI populations is lacking, possibly reflecting the routine absence of reporting of sexual attraction, orientation or identity following suicide.[51] However, a number of international studies have investigated suicide-related behaviour in LGBTI populations. Findings indicate that LGBTI populations experience both suicidal ideation and engage in suicide attempts at higher rates than non-LGBTI populations.[51,52,53,54] Given that ideation and attempt are themselves risk factors for suicide, it is reasonable to assume that LGBTI populations are also at increased risk of suicide.

3.2 Interventions

While there is significant evidence pertaining to suicide rates and risk factors, less evidence exists regarding the effectiveness of specific interventions.[55,56] Evidence about suicide prevention interventions obtained from the Stage 2 Literature Review falls into three contexts:

- Multifaceted interventions spanning universal, selective and indicated approaches ('broad-spectrum' interventions)
- Single intervention types
- Specific interventions delivered in Indigenous populations.

3.2.1 Broad-spectrum interventions

The literature search retrieved four well-conducted reviews examining interventions that spanned the full spectrum of universal, selective and indicated approaches. The earliest of these studies was conducted by Mann and colleagues,[57] who examined 93 studies published between 1966 and June 2005, in order to identify the effectiveness of specific suicide prevention interventions. The interventions examined in

this review were:

- Restricting access to means of suicide
- Guidelines for media reporting of suicide
- Awareness and education programs targeting the general public, general practitioners (GPs) and 'gatekeepers'
- Screening programs
- Treatment interventions, including medication for the treatment of mental disorders, psychotherapy and follow-up care after a suicide attempt.

The outcomes assessed by study authors were completed and attempted suicide and suicidal ideation or, where applicable, intermediate outcomes, such as help-seeking behavior, identification of at-risk individuals, entry into treatment, and antidepressant prescription rate.

Based on the outcomes assessed and the quality of evidence, the authors concluded that overall the most promising interventions were GP education programs focusing upon better detection and treatment of depression, restricting access to means of suicide and gatekeeper training. These are discussed in more detail in the next section.

Beautrais and colleagues[58] looked more specifically at effective strategies in New Zealand. Like the study by Mann et al, this review identified three interventions for which 'strong' evidence pertaining to their effectiveness exists: training for medical practitioners, means restriction and gatekeeper education.

The more recent study by Feltz-Cornelis and colleagues[59] reviewed findings from systematic reviews investigating the effectiveness of interventions for the prevention of suicide, with the aim of identifying evidence-based components that could be included within multilevel suicide prevention strategies. The authors concluded that at least three types of interventions have evidence for their effectiveness. These include training GPs to recognise and treat depression and suicidality, means restriction and improving access to care for at-risk groups (e.g. gatekeeper training and follow up of high-risk groups). These findings reflect those of both Mann et al and Beautrais et al.

Finally, the study by Nordentoft[60] reviewed the available literature around suicide prevention, using the universal, selective and indicated prevention model to classify findings. The author described intervention strategies at each level within the prevention model and, where intervention evidence was lacking, identified risk factors as potential intervention targets.

At the universal level, means restriction was identified as an effective intervention (although levels of evidence were not presented). At the selective level, a lack of evidence for prevention strategies was outlined, however high-risk groups (e.g. those with mental illness, substance misusers, homeless people and prisoners) were identified and potential interventions targeting these groups were alluded to (e.g. education/training strategies for those involved in diagnosis and treatment). At the indicated level, follow up after suicide attempt was noted as an effective strategy for preventing subsequent attempts. Psychological and pharmacological interventions were also described, however no firm conclusions about their effectiveness were presented.

3.2.2 Single intervention types

In addition to the reviews described above, 13 other papers were identified that systematically reviewed one particular type of intervention. Six of these described universal approaches, of which three reviews examined the effectiveness of restricting access to means of suicide,[61,62,63] two described school-based education and awareness programs,[64], [65] and one reviewed media reporting of suicide.[66] Three described selective approaches,[11,67, 68] two described indicated approaches,[69 70] and two described postvention approaches.[71 72]

In addition, six studies were identified that reviewed interventions for a specific at-risk group; of these four reviewed interventions targeting young people,[56 65 73 74] one assessed interventions for the elderly,[11] and one assessed suicide prevention approaches for military veterans.

These individual intervention types are discussed further in the next section.

3.2.3 Interventions in Aboriginal and Torres Strait Islander populations

Three articles retrieved by the current search reported on individual studies of interventions in Indigenous populations. One of these reported on a series of health promotion and awareness-raising initiatives in a rural community in South Australia.[75] The other two reported on aspects of gatekeeper training programs conducted in New South Wales and Central Australia respectively.[76,78]

The first article reported on the development of a series of mental health promotion-type activities that targeted Indigenous communities in rural South Australia. Components of the program focused upon raising awareness of suicide among community members, assisting community members to identify and support people at risk of suicide, delivery of the Applied Suicide Intervention Skills Training (ASIST) program, [77] self-esteem and resilience-building initiatives and leadership and community identity initiatives. The program was subject to a process evaluation, which led the authors to draw conclusions regarding the importance of placing interventions in a relevant sociopolitical context, local relevance, and sustainability. It also enabled them to make a series of 'good practice' recommendations for future projects. However, the article did not report on the actual impacts of the program on any suicide-related outcomes, therefore its ability to provide information regarding the effectiveness of programs such as this on Indigenous suicide rates is limited.

Of the gatekeeper training studies, the first by Capp and colleagues[78] reported on a series of community gatekeeper training workshops delivered to Aboriginal community members in New South Wales. The workshops aimed to increase the ability of members of the Aboriginal community to identify and support people at risk of suicide, as well as facilitate access to relevant services. Workshop participants included community members, students and Aboriginal workers from health, education and youth work backgrounds. The authors report that the program led to an increase in participants' knowledge about suicide, greater confidence in identification of people who are suicidal, and high levels of intentions to provide help, suggesting that gatekeeper training may also be an effective approach among Indigenous communities. That said, as with the other studies reported above, their impact on actual suicide-related behaviour is untested. It must also be noted that this is only one small study that was conducted in a specific area in New South Wales, and the results may not be generalisable to other Indigenous communities across Australia. Further, no follow-up assessment was conducted, and whether or not the changes demonstrated over the course of the workshop were sustained over time is therefore unknown.

The second study employed qualitative techniques to evaluate a training resource specifically developed for use in suicide prevention workshops targeting central Australian Indigenous communities. The

training resource, 'Suicide Story' consists of a DVD that covers a range of topics relevant to many suicide intervention training tools, but also elements specific to Indigenous suicide; it incorporates film, animation, artwork, music and interviews. The aim was to provide a culturally-sensitive approach to increase understanding about suicide, as well as improve gate keepers' skills in working with people at risk. The resource is to be used by skilled trainers in the context of a three and a half day suicide prevention workshop. The development, implementation and evaluation of the resource was underpinned by the philosophy of 'cultural safety', which recognises that the delivery of suicide prevention programs needs to reflect the diversity that exists between Indigenous and non-Indigenous populations, as well as the differences within Indigenous groups, highlighting the need for locally and culturally-specific approaches to suicide prevention. The authors report that the DVD increased trainees' knowledge and confidence to respond to someone at risk of suicide, and that applying the principles of 'cultural safety' in the context of suicide prevention can "lead to initiatives that are more informed, more applicable, and ultimately more effective" (p1).

4 DISCUSSION

4.1 High-risk groups

The review identified a raft of evidence identifying those groups that are at elevated risk of suicide. These correlate to some degree with those identified by the LIFE Framework as being supported by Level A ('strong') evidence. However, as the definition of Level A evidence in the LIFE documentation extends to robust evidence other than systematic reviews and meta-analyses, it is unsurprising that not all were captured in the current review. In addition, the LIFE analysis concentrated on risk factors, rather than at-risk groups, and utilised statistical data in addition to peer-reviewed literature, further accounting for differences.

These LIFE Framework risk factors include family history of suicide and psychopathology, negative life events and low coping potential, marital status (with people who are divorced, widowed, separated and single identified at higher risk), low socioeconomic status and unemployment, and neurobiological, psychological, social and environmental factors.

Interestingly, the current review suggests good evidence for groups not identified in the LIFE Framework being at increased risk of suicide: these include culturally and linguistically diverse populations and LGBTI communities (identified in the LIFE Framework, but with a cited lack of good evidence), youth and current or recent prisoners.

These inconsistencies highlight the need for more robust data collection processes and further research in this area.

4.2 Interventions

4.2.1 Universal approaches

As noted above, universal approaches to suicide prevention target whole populations with the aim of reducing risk factors or enhancing protective factors. The types of universal interventions identified by

the current search include restricting access to means of suicide, guidelines for media reporting of suicide, and school-based suicide education and awareness programs.

Reducing access to means

Restricting access to the means of suicide is a feature of most national suicide prevention strategies, and was highlighted by each of the four papers that reviewed broad-spectrum approaches to suicide prevention as one of the more effective interventions to date.[57-60] Three additional retrieved studies reviewed the literature specific to means restriction as a suicide prevention method.[61-63] These studies add support to the above conclusions that restricting access to means reduces the number of suicide deaths.

The studies by Mann et al and Beautrais et al[58] report that restricting access to certain suicide methods has been shown to reduce the number of suicide deaths by that method, including in the case of firearms, pesticides, medication such as barbiturates and analgesics, compulsory use of catalytic converters in motor vehicles, construction of barriers at jumping sites, and the use of new, lower toxicity anti-depressants. Although the authors acknowledge that substitution of method can occur, restriction of a common means of suicide in a given country can lead to a reduction in the overall suicide rate. For example, this has been the case following the restriction of firearms in parts of North America and Canada, and barbiturate restriction here in Australia. However, restricting common means of suicide may be easier in some cases than others: for example, it may be easier to restrict access to pesticides than to hanging (the most common method of suicide in Australia). Furthermore, in order for means restriction to be an effective strategy access to timely and accurate national mortality data is required so that interventions can reflect current trends.

Implementation of media guidelines

The reporting of suicide in the media has the potential to precipitate suicidal behaviour in vulnerable individuals. For example, a recent systematic review by Sisask et al concluded that there was an association between media reporting of suicide and actual suicide. The type of media exposure rather than suicide reporting per se, likely explains the link: sensationalising suicide, explicit descriptions of means and the portrayal of suicide as a legitimate solution to problems by the media may contribute to increasing suicide risk in some vulnerable individuals.[79] Pirkis et al[80] report that media items on suicide are more likely to be associated with suicide if they appear on television rather than radio, and if they report on actual suicide, rather than suicidal ideation or attempted suicide.

Some countries have implemented reporting guidelines in response to these findings, and the reviews by Mann et al and Beautrais et al highlight that reporting guidelines may be used to achieve accurate and non-sensationalist reporting of suicide. Beautrais et al outline that there is potential to work "…collaboratively with media to disseminate factual, accurate evidence and information about suicide and mental health in a non-stigmatising manner and to promote knowledge and information about suicide prevention".

Bohanna et al[81] recently undertook a systematic review assessing evidence for the effectiveness of media guidelines on the reporting of suicide. The authors concluded that guidelines are able to prevent imitative suicide, however the awareness, use and opinion of such guidelines by journalists is generally low. Given this, more training and collaboration between media and mental health agencies is likely to improve the implementation, and thus effectiveness of such guidelines.

Responsible media reporting is a feature of the majority of suicide prevention strategies across the world, including in Australia. However, there remains much to be done to promote responsible and informed media coverage of suicide by maintaining, implementing and promoting the use of existing media resources, and by working collaboratively with media professionals and outlets, around the dissemination of factual information about suicide and mental health (and its prevention) in a non-stigmatising or non-sensationalist manner. There is additional evidence generated by Australian-based researchers who report that the implementation of media guidelines here in Australia has led to an increase in both the number and quality of media reports about suicide,[82] adding more weight to the value of such guidelines.

Awareness programs

Awareness programs were highlighted by each of the four reviews that looked at the broad-spectrum interventions for suicide prevention.[57-60] However, the effect of these programs on rates of suicide is unknown. These programs usually target the general public with the aim of increasing education and awareness of suicidal behaviour and mental illness, improving understanding by recognising established risk factors and reducing stigma by challenging unhelpful perceptions or myths. The overarching aim is to increase treatment seeking, support and recognition for those with suicide risk and mental illness and, by this mechanism, influence suicide rates.

General population education and awareness programs appear somewhat effective in changing attitudes but fall short of translating attitude change into behaviour change. For example studies in the UK, Germany, New Zealand and Australia indicate these programs have some effect on attitudes regarding causes and treatments for depression however they do not appear to reduce suicidal behaviour or increase help seeking.

There is some evidence to suggest that more success may be had with programs that are targeted to specific groups (e.g. adolescents) and with those particularly aimed at suicide prevention as opposed to depression or mental illness more generally. Some have suggested that school-based suicide prevention programs are effective in terms of increasing students' knowledge in relation to suicide. However, within their review, Ploeg and colleagues also note the potential risk for such programs in increasing hopelessness and maladaptive coping behaviours in males specifically. Cusimano and Sameem, in a more recent systematic review of school-based suicide prevention programs concluded that knowledge, attitudes and help-seeking behaviours were increased as a result of such interventions; however, insufficient evidence exists to determine the impact they have on actual suicide rates.

There is limited evidence to support the use of large-scale suicide awareness programs in schools, although the review conducted by Cusimano and Sameem cited above did report some potential benefits of such programs. However, it is worth noting that concerns continue to be expressed regarding the possibility of iatrogenic effects of such programs, particularly among already vulnerable youth.[83] To our knowledge, to date no studies have examined the potential for negative effects, which has led some to recommend that broad-based awareness programs should focus on mental health promotion and not suicide itself, until evidence exists to demonstrate their safety.

4.2.2 Selective approaches

As noted previously, selective interventions target subgroups whose members are not yet manifesting suicidal behaviours, but exhibit proximal or distal risk factors that predispose them to do so in the future.

The types of selective approaches identified in this review are GP education, gatekeeper training and screening programs.

General practitioner education

The relationship between depression and suicide risk is well established.[84,85] In addition, depression is often under-recognised and under-treated by GPs, yet many people who die by suicide have had recent contact with a GP.[86] Thus GP education programs are based on the premise that improving the ability of GPs to identify and treat depression will lead to a reduction in suicide rates. These types of program have been tested in a number of countries around the world and have been shown to lead not only to increases in rates of anti-depressant prescribing, but also (often substantial) decreases in rates of suicide, leading Mann et al to conclude that such education programs 'represent the most striking known example of a therapeutic intervention lowering suicide rates' (p2067).

These programs were also cited by Beautrais et al, Feltz-Cornelis et al and Nordentoft as one of the most effective suicide prevention strategies to date.

Gatekeeper training programs

'Gatekeepers' can include clergy, first responders, pharmacists, geriatric caregivers, and those employed in schools, prisons, sports clubs and the military.

Gatekeeper training was identified as an effective preventative approach by three of the four reviews of broad-spectrum interventions retrieved by the current search.[57, 58,] Two further relevant studies were also retrieved: one reviewed gatekeeper training across all populations,[87] while the second reviewed all school-based interventions (including gatekeeper training programs).[73]

These programs generally focused on raising awareness of risk factors for suicide, increasing confidence and perceived skill when working with at-risk populations, policy changes to encourage help-seeking, improving the availability of resources, and stigma reduction. However, some of these programs (i.e. those conducted in institutional settings such as the Norwegian Army and the US Air Force where the roles of gatekeepers were formalised, and pathways to treatment were readily available) also promoted organisation-wide awareness of mental health and suicide and facilitated access to mental health services. It was these types of programs that reported the greatest level of success in lowering suicide rates. That said, others reported increases in knowledge, confidence and perceived skill when working with at-risk people, however their impact on rates of suicide-related behaviour and overall suicide rates remains unknown.[73, 87]

The current search also retrieved two gatekeeper interventions in Indigenous populations that have been formally evaluated (see 'Interventions in Indigenous populations' below).

It is not clear from the literature exactly which gatekeeper or educational programs are the most effective, or indeed which components of training programs lead to the best results. Therefore specific recommendations cannot be made regarding which programs should be funded. However, together these findings have led both the Senate Inquiry into Suicide in Australia[88] and a more recent Parliamentary Inquiry into Youth Suicide in Australia[89] to recommend an increase in the delivery of gatekeeper training across the country, including in rural and remote areas.

Screening programs

Screening programs generally aim to identify at-risk individuals in order to direct them to appropriate treatment. These programs either directly screen for suicide risk behaviours (e.g. suicidal ideation) or for known associated risk factors (e.g. mental illness). Both Mann et al and Beautrais et al indicate that some success has been noted with both types of screening programs in terms of increasing the number of individuals identified as being at risk. However the effect of screening and increased identification on the prevention of suicide remains unclear. This is highlighted by the findings of a systematic evidence review prepared for the US Preventative Service Task Force,[90] which established that no published studies have yet investigated the effect of suicide screening on actual suicide rates.

Pena and Cane[91] and Robinson et al have both reviewed types of screening programs used to detect adolescents at risk of suicidal behaviour, the latter specifically focusing on those used in a school setting. It was concluded that overall, screening programs are able to successfully identity students who are at risk of suicidal behaviour who may not have otherwise come forward for help. However, more research is needed in order to determine the long term benefits of such programs, the referral pathways subsequently utilised by students, and the take up rate of mental health services as a result of the screening process.

Lapierre et al report that screening for depression is one of the most popular suicide prevention approaches used within elderly populations, although not all programs measured suicide-related outcomes. Oyama and colleagues[92] found that community-based depression screening programs in Japan amongst the elderly are associated with a reduced risk of completed suicide.
While the effectiveness of screening programs requires additional research in various populations and settings, at present there is no evidence to suggest that screening for suicide risk is harmful or increases the risk of suicide or suicidal behavior.[93]

4.2.3 Indicated approaches

As described previously, indicated interventions are designed for people who are identified as already beginning to exhibit suicide-related thoughts or behaviours. Types of indicated approaches identified in the current review are pharmacological interventions, psychological interventions and follow-up care post suicide. While there are approaches that show promise in this area, there is clearly a need for more intervention research that specifically targets people demonstrating suicide-related behaviour, in order to ascertain the effectiveness of these approaches in reducing relevant outcomes in those at risk.

Pharmacological treatment

There has been debate in the literature over the past decade as to whether pharmacological interventions reduce the risk of suicide-related behaviour. A limited number of reviews were identified in the current search that assessed the effect on suicidal behaviour of pharmacological treatments used to treat a variety of mental health disorders, including Major Depressive Disorder (MDD) and Attention Deficit-Hyperactivity Disorder (ADHD).

In the past, concerns were raised about whether the use of Selective Serotonin Reuptake Inhibitors (SSRIs) to treat depression may increase suicidal risk in some patients. The current search identified one study that found that the use of SSRIs by adults may reduce the risk of suicide in this population group,[94] however, this systematic review included observational studies only. Systematic reviews of trials using duloxetine and fluoxetine to treat MDD in adults have found no evidence that the approach

increased the rate of suicidal behaviour or ideation in participants[95,96] and in some cases pharmacotherapy has been associated with greater improvement, and faster resolution of suicidal ideation than placebo.

In children and adolescents, the use of pharmacological interventions to treat suicidal behaviour is even less clear. Recent research has suggested that in children and adolescents, certain classes of drugs (most notably SSRIs) may actually increase this risk.[97] The review by Barbui et al found that SSRIs increase the risk of suicidal behaviour in adolescents, despite observing the opposite trend in adults. In addition, a meta-analysis assessing the effectiveness of paroxetine found a higher incidence of suicidal behaviour in young people aged between 18 and 24 years with MDD specifically, compared with adults over 24 years of age.[98] However, whilst acknowledging that there may be an increase in the risk for suicidal behaviour in the younger population when prescribed SSRIs, Bridge et al conclude that the benefits of medication may outweigh the risks in certain age and chronicity profiles.[99]

Psychological treatment – cognitive behavioural therapy (CBT)

One of the first systematic reviews to assess the effect of CBT on suicidal behaviour was conducted by Van der Sande et al[,69] who investigated randomised controlled trials involving suicide attempters. They found that CBT had a protective effect on future suicide attempts in this population, but noted the large variability in the quality of trials.

Tarrier and colleagues conducted a systematic review and meta-analysis of CBT-based interventions aimed at reducing suicidal behaviour in adults and adolescents, demonstrating that these interventions effectively reduced suicidal behaviour and proximal suicide risk factors. For example, CBT was found to be more effective than minimal treatment and treatment as usual but did not demonstrate superiority to other active interventions. The authors also concluded that interventions aimed directly at reducing some aspect of suicidal behaviour, as opposed to targeting an associated risk factor (e.g. depressive symptoms), are likely to be more successful at reducing specific suicidal behaviour.

Robinson et al conducted a systematic review of interventions aimed at young people with a history of suicide attempt, suicidal ideation or deliberate self-harm. One trial indicated positive findings for CBT when compared to treatment as usual, showing that CBT effectively reduced the incidence of deliberate self-harm and suicidal ideation. While the evidence base for CBT delivered to young people with suicidal behaviour is small, these results indicate that it is a promising intervention strategy.

While it is acknowledged that reductions in measures of depression and suicide-related behaviour do not translate directly to reduced suicide rates, CBT-based interventions appear promising in ameliorating a range of suicide-related behaviours (e.g. ideation, plan, attempt) in those at risk. These effects appear strongest over the immediate to short term following treatment, and to reduce over time.[70] Given that suicidal risk likely fluctuates over time, intervention programs need to consider strategies around follow up and maintenance of treatment gains over the medium to long term. It should also be noted that high-risk suicidal people are frequently excluded from research for a number of reasons,[100] making it difficult to draw conclusions as to the efficacy of a range of indicated interventions, including CBT, on this population.

Follow-up care after suicide attempt

The studies by Mann et al, Beautrais et al and Nordentoft each identified follow-up care as a promising suicide intervention strategy following a suicide attempt, presenting evidence to suggest that it can reduce the number of subsequent suicide attempts and possibly the rate of completed suicide.

Follow-up strategies have the potential to keep high-risk individuals linked with services, facilitate future service access and assist with maintaining adherence to treatment regimes. Components of the follow-up strategies outlined within the reviews have not been fully identified or evaluated, however examples may include regular, brief telephone or letter contact, coordinating follow-up appointments, linking services and providing information about emergency access to mental health care.

4.2.4 Postvention

Postvention refers to a range of strategies that can be delivered following a suicide event, generally targeting individuals or groups who have been affected by, or are in close proximity to a suicide. The aim of these strategies is to reduce the distress experienced in response to a suicide and the risk of suicide contagion.

Szumilas et al reviewed the literature on suicide postvention programs, including school-based, family-focused and community-based programs. The authors examined data evaluating these programs and concluded that there was no protective effect on suicide rates or suicide attempts. However, some program components that had positive effects on knowledge, help-seeking and psychological distress were highlighted, namely gatekeeper training, counseling for survivors and the provision of outreach support at suicide sites.

Cox et al looked specifically at postvention strategies delivered in response to suicide clusters in young people. The results of this review indicate that few evaluations of postvention responses have been conducted, making it difficult to draw firm conclusions about the effectiveness of these strategies on the reduction of suicide risk or completed suicide. However, some promising strategy components were described, including the development of a community response plan, educational/psychological debriefings, provision of both individual and group counseling to affected peers, screening of high-risk individuals, responsible media reporting of suicide clusters and promotion of health recovery within the community to prevent further suicides. The Australian government has recently produced a set of community guidelines[101] that provide assistance to communities who wish to develop and implement a community response plan such as those noted in this review: these represent a new initiative and are yet to be evaluated.

McDaid et al conducted a systematic review of interventions for people bereaved through suicide. They found some evidence for the benefit of a four-session cognitive behavioural family intervention for first-degree relatives and their spouses compared with no intervention. At 13-month follow up, participants reported fewer maladaptive grief reactions, and less perception of being blamed for their relative's suicide.

In addition, Robinson et al reviewed the available literature specific to school-based suicide postvention programs, again noting a considerable lack of evidence pertaining to postvention strategies.

4.3 Interventions in Indigenous populations

Each of the articles retrieved by the separate search for interventions undertaken specifically in Indigenous populations are single studies,[75,76,78] of which two have key methodological limitations.[75,78] This means they are of limited utility in terms of informing suicide prevention initiatives among Indigenous Australians.

In addition, the Closing the Gap Clearinghouse[102] recently released a resource sheet summarising policies and programs aimed at reducing suicide and suicidal behavior. This information captures key learnings from work undertaken specifically in Indigenous populations as well as more generalised programs that may be suitable for adaptation into Indigenous contexts. The Clearinghouse concludes that there is evidence for 'community programs that focus on the social, emotional, cultural and spiritual underpinnings of community wellbeing' in suicide prevention, and that 'a number of effective non-Indigenous-specific programs have been shown to be culturally appropriate and acceptable to Indigenous people'.

It is widely accepted that there are significant differences not only between Indigenous and non-Indigenous suicides, but also between different Indigenous communities,[103,104,105] meaning that interventions that are appropriate for one community may not be for another.[106] This raises questions about the generalisabilty of research findings from any single study. As a result, it has been recommended that a series of 'community-specific strategies' should be developed and evaluated that can respect and accommodate the unique nature of different Aboriginal groups and communities, and that employ appropriate methodological approaches.

4.4 Data availability and study limitations

A number of limitations to the current review need to be taken into account when interpreting the findings. Firstly, the current search was restricted to systematic reviews and meta-analyses, as it was beyond the project's scope to retrieve all articles pertaining to high-risk groups for suicide and suicide-related interventions. However, the systematic reviews conducted in the area of suicide prevention that are highlighted used a thorough methodology and, as such, were likely to have picked up key articles of interest.

Due to time constraints, the only database searched was Medline. However, past experience suggests that this database would have most likely included all the articles that met the inclusion criteria for the current review.

A further limitation relates to the identification of studies reporting on programs designed to reduce the risk of suicide in Indigenous populations: no systematic review articles were retrieved by our search. However, because the level of risk is high among this population and the relevance of this issue to Australia's suicide prevention program, we conducted a separate search that retrieved three articles.

Other limitations exist that are not specific to this review. One such factor is the absence of standardised definitions of the key outcomes of interest and the use of variable terminology and outcome measures across those studies included in the reviews cited here, which can make it difficult to generalise findings across studies.

Further, as has been previously reported,[107,108] there is in general a lack of intervention studies assessing suicide-related outcomes, in particular suicide itself. Although suicide is widely regarded as a significant public health problem, it is, in statistical terms, relatively rare, meaning that in order to conduct

research with suicide as an outcome, very large studies with long follow-up periods are required. As a result, studies are often not adequately powered to measure suicide as an outcome and therefore frequently report on proxy outcomes such as suicidal ideation, suicide attempt and deliberate self-harm, and in some cases help-seeking behavior, identification of at-risk individuals, entry into treatment, and antidepressant prescription rate. Whilst this is not unusual in suicide research there remains a need for large, adequately powered studies that can examine the effects of interventions on rates of suicide.

The issue of sub-optimal data collection and recording processes has been the subject of much discussion in Australia and internationally.[109, 110] In 2010, the Senate Inquiry into Suicide in Australia (*The Hidden Toll: Suicide in Australia*)also raised concerns regarding the accuracy of suicide reporting in Australia and outlined a number of factors that may impede the accurate identification and recording of possible suicides, noting the consequences of any under-reporting for the understanding of risk factors and provision of services to those at risk. The Senate Inquiry recommended a program of reform designed to improve the accuracy of suicide statistics across the country and the timely dissemination of these data, in order that suicide prevention programs can be responsive to current need. The Government responded positively to these recommendations in the Commonwealth Response to *The Hidden Toll: Suicide in Australia*.[111]

5 CONCLUSIONS

The current review highlights those groups for whom the evidence indicates elevated risk of suicide, and those interventions for which the most evidence of effectiveness exists.

While the identification of population subgroups at increased risk of suicide varies according to method, it is clear that targeting these groups most at-risk (as well as relevant 'gatekeepers') forms an important component of a broad-spectrum, multi-faceted approach to suicide prevention, particularly on a national scale.

There is some evidence to suggest that national suicide prevention strategies have the ability to lead to reductions in suicide rates,[112] in particular among certain subsets of the population (namely elderly and young people).[113]. However, it is harder to determine exactly which components of national strategies are the most effective. From this review it can be concluded that the interventions for which the best evidence exists are reducing access to means of suicide, educating general practitioners to better recognise and treat depressive disorders, and gatekeeper training programs. There is also some evidence to suggest that the implementation of media guidelines, screening programs and CBT may be promising.

A lack of relevant data and variations in study design and quality mean that the evidence in this area is often insufficient to prescriptively inform future suicide prevention initiatives. This is particularly true for interventions specifically targeting Indigenous populations.

However, an absence of evidence does not equate to evidence of absence. This observation is supported by the LIFE Framework itself,4 which identifies the need for an expansion of the evidence base regarding suicide prevention. The Senate Inquiry into Suicide in Australia and the Parliamentary Inquiry into Youth Suicide both also called for a national program of funding for research into suicide prevention, including detailed evaluation of suicide prevention interventions and the development of a coordinated and targeted program of research into this area respectively. A specific program of

research that can develop and test interventions designed to reduce suicide risk among Australia's Indigenous population, and using culturally appropriate methodologies, is also clearly warranted.

For all of these reasons, and because suicide is multi-faceted and complex, it is widely agreed that suicide prevention activities need to be broad-based, reflecting the full spectrum of approaches, including universal, selective and indicated interventions.[57,58,59,60] The evaluation of the NSPP, informed in part by this literature review, will be a key process in ensuring that future national suicide prevention strategies are based, as far as possible, on evidence of effectiveness for individual components and the strategy as a whole.

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Appendix E – NSPP Stage 2 Literature Review

1 INTRODUCTION AND BACKGROUND

1.1 Evaluation of the National Suicide Prevention Program – literature review

The evaluation of the National Suicide Prevention Program (NSPP) has been informed by an in-depth literature review with two distinct stages. Stage one of the literature review sought to inform the development of a robust Evaluation Framework to be employed by the evaluation. To achieve this, all published articles relating to the evaluation of suicide prevention programs both in Australia and internationally were identified. The key aims of the Stage 1 Review were to:

1. Examine each of the evaluation frameworks and methodologies employed, in order to determine whether or not they could help to inform the development of a framework to be employed by the current evaluation
2. Identify the various quantitative and qualitative performance indicators that have been used to evaluate the effectiveness of programs, and could potentially be applied in the Australian context
3. Identify appropriate quantitative and qualitative tools that have been used to define and measure the impacts of suicide prevention activities that could be used in Australia
4. Identify key (Australian) stakeholders who may be able to contribute to the stakeholder consultation.

The conclusions from this component of the review highlighted that while the majority of national suicide prevention strategies identified set out a series of goals and/or objectives for action, for the most part they did not outline a clear framework for evaluation. A minority of strategies (or supporting action plans) included performance indicators or targets; some included specific sources of data for monitoring success against these indicators; some nominated the agency responsible for implementing each goal; and some included specified timelines for action. Only one included an economic evaluation. For some countries either independent evaluations or documents reporting on the progress of a strategy were available. However, the application of clear evaluation frameworks was rare.

The purpose of the second stage of the literature review was to enable conclusions to be drawn about the effectiveness of Australia's suicide prevention efforts to date, compared with other local and international efforts. Building on the information obtained in stage one, the stage two literature review was conducted to assist the evaluators in:

- Determining whether or not the approach taken in Australia reflects international best practice
- Examining how outcomes achieved in Australia compare to those reported elsewhere
- Identifying any gaps in systems of delivery and evaluation
- Highlighting possible improvements in the way suicide prevention activities are delivered and evaluated in Australia.

In particular, it examined and synthesised the evidence with regard to those groups at elevated risk of suicide and the effectiveness of specific suicide prevention interventions.

1.2 An overarching framework for suicide prevention strategies

In response to high suicide rates around the world, the United Nations (UN) published guidelines in 1996 that aimed to encourage and assist countries in developing national suicide prevention strategies.[1] Acknowledging that the pathways to suicide are often complex and multifaceted, the guidelines

recommended that strategies should adopt a range of approaches and activities, target their activities towards a range of at-risk groups, and that they should be based upon the best available evidence.

Many countries have since developed national approaches to suicide prevention based on these recommendations. The complexity of such multifaceted approaches and specific targeting of high risk groups can be conceptualised under the framework originally developed by Mrazek and Haggerty,[2] and later adapted by Silverman and Maris,[3] which classifies suicide prevention activities into 'universal', 'selective' and 'indicated' approaches.

Universal approaches target whole populations, with the aim of favourably shifting proximal and distal risk and protective factors across the entire population. Selective interventions target subgroups whose members are not yet manifesting suicidal behaviours, but exhibit risk factors that predispose them to do so in the future. Indicated interventions are designed for people who are identified as already beginning to exhibit suicidal thoughts or behaviours.

1.3 Australia's approach

Australia was one of the first countries to develop a national suicide prevention strategy.[4] This is operationalised through the LIFE Framework and supported by a national program of funded activity (the NSPP). Drawing upon the priorities set out in the LIFE Framework, and in line with the UN recommendations described above, this funding program is dedicated to both population wide (i.e. universal) and targeted (i.e. selective or indicated) suicide prevention activities, i.e. supporting broad population health approaches where proven effective, as well as targeted interventions directed towards groups identified as being at increased risk of suicide. In addition, the LIFE Framework highlights the importance of ongoing evaluation in order to ensure that the program of work is (as far as possible) evidence-based.

2 METHODS

Evidence pertaining to high-risk groups and interventions aimed at reducing suicide-related behavior was identified through a literature search. The Medline database was searched in September 2012 using the keywords 'suicid* AND (systematic OR meta-analysis)'. No date restrictions were placed on the search. In order to ensure that as many relevant articles as possible were found, reference lists of key articles identified by the search were examined, and publications by key authors in the area of suicide prevention were reviewed. Due to the scope of the project, only articles that systematically reviewed either groups at elevated risk of suicide or interventions designed to reduce suicide risk were included. Articles that reported on individual studies were not included.

Articles describing interventions in Australian Indigenous populations were identified separately, because there were likely to be much fewer trials specifically targeting these populations subjected to systematic review. For this information, Medline was searched more broadly, using the terms 'suicid* AND (Indigenous OR Aboriginal)' with additional hand searching. These search results were screened to identify studies that were conducted in Australia and reported on the effects of specific interventions.

Where possible, the findings are presented in an Australian context, supported by the most recent national mortality data reported by the Australian Bureau of Statistics.

3 RESULTS

One hundred and forty articles were retrieved by the search, of which 39 focused on those groups at elevated risk of suicide, and 41 reported on the effectiveness of specific interventions or approaches to suicide prevention. Three articles reported on individual studies of interventions in Indigenous populations.

A further 33 articles were identified through hand searching of references, and targeting key authors in the area of suicide prevention.

3.1 High-risk groups

This section summarises evidence obtained from the retrieved literature regarding those subgroups of the general population that are at elevated risk of suicide. It also considers high-risk groups that are specific to Australia.

3.1.1 Men

Suicide is one of the leading causes of death among men, both here in Australia and around the world. The most recent Australian data show that men account for three quarters of all deaths by suicide,[5] whilst in England suicide is the leading cause of death in men under 35 years.[6] Young men are at especially high risk, with suicide being the second-leading cause of mortality (behind accidental death) for this group around the world[7] [25], and the greatest cause of premature mortality in Australia.[5]

3.1.2 Youth

Internationally, youth suicide rates have gradually been increasing and young people are now at the highest risk of suicide in one third of all countries (both developed and developing).[7] At least 100,000 adolescents die by suicide every year[8] and, worldwide, suicide ranks in the top five causes of mortality among 15 to 19 year olds.[9]

In Australia, the most recent data available demonstrate that suicide is the leading cause of death among Australians aged between 15 and 24, accounting for between 22% and 24% of all deaths in this age group[5]. In 2010 there were 113 suicide deaths among 15-19 year olds and 183 among those aged 20-24.[5]

3.1.3 Older adults

Suicide rates are highest amongst the elderly population according to the World Health Organisation[8] (WHO), and in Australia, suicide rates in older adults are at a similar level to those of young people.[10] It has been suggested that the elderly are at risk of suicide due to a number of factors, including psychiatric illness (most notably depression), physical and functional impairment and the impact of stressful life events, including bereavement.[11]

3.1.4 Culturally and linguistically diverse (CALD) populations

People who were born overseas make up around 25% of all suicides in Australia each year.[4] Possible reasons for this may be that people from CALD communities do not seek help for mental health issues, or the information/support that is available may not be in their language. Furthermore, those who have experienced a traumatic event may be at higher risk for subsequent mental health issues such as depression or Post Traumatic Stress Disorder (PTSD) that in turn increase their risk of engaging in suicidal behavior.[12]

3.1.5 Indigenous populations

In Australia, the suicide rate in the Aboriginal and Torres Strait Islander population is over two times higher when compared with non-Indigenous Australians.[5] Between 2001 and 2010 there were 996 deaths by suicide among Indigenous Australians and although rates have been decreasing in recent years, suicide among Indigenous people remains disproportionately high relative to non-Indigenous Australians.[13] This is particularly notable in young people: in Indigenous children younger than 15 years, the suicide rate was more than seven times higher than their non-Indigenous peers, and in the 15-24 age group, Indigenous youth had a suicide rate 3.6 times higher than that for non-Indigenous youth.[14]

Recent research using the Queensland Suicide Register suggests that Indigenous people who have died by suicide were less likely to have sought treatment for a psychiatric condition or be diagnosed with depression compared with non-Indigenous individuals who have also died by suicide.[15] Other risk factors may be disproportionately high in Indigenous populations, including demographic isolation, substance abuse and imprisonment.[16]

3.1.6 Rural and remote populations

There is some evidence to suggest a higher rate of suicide in rural and remote areas, when compared to metropolitan areas, especially amongst men.[17,18] Potential explanations as to why this may be include greater access to firearms, lower socioeconomic circumstances, and higher levels of social isolation.[19]

3.1.7 People with mental illness

The relationship between mental illness and suicide is well established, with a systematic review of psychological autopsy studies estimating that 83% of suicide cases had a history of mental illness.[20] In terms of attempted suicide, evidence suggests that more than 50% of those who attempted suicide had a previous mental illness.[21] Suicide-related behavior is associated with a broad range of mental disorders, including major depressive disorder, bipolar disorder, anxiety disorders, schizophrenia, substance use disorders, anorexia nervosa, and borderline personality disorder.[22,23,24,25,26,27,28] Previous suicide-related behaviour has also been found to be a strong predictor of subsequent suicide-related behaviour in those admitted for inpatient psychiatric treatment.[29]

With regard to young people specifically, suicidal youth are six times more likely to have a psychiatric disorder compared with non-suicidal youth[30] and psychiatric issues present as early as eight years of age can be predictive of future suicidal behaviours.[31]

3.1.8 Those with substance-related disorders

The literature pertaining to both adults and adolescents indicates a strong association between substance misuse and suicide-related behavior,[32,33] showing that those who misuse substances and those with substance use disorders are more likely to attempt, and die by, suicide. A recent review of psychological autopsy studies estimated that between 15 and 61% of those who died by suicide suffered from a substance use disorders.[34] Additionally, substance use disorders commonly occur alongside mental illness (e.g. depression) and, given the link between mental illness and suicide risk, this further increases the risk.[35]

While the elevated risk of suicide in those who misuse substances is well established, the mechanisms that account for it are not. Likely explanations include proximal effects (e.g. effects of intoxication), distal effects (e.g. social isolation, family breakdowns) and common factors that predispose an individual to both substance misuse and suicide-related behaviour (e.g. mental illness).

3.1.9 People who have previously engaged in suicide-related behavior (including suicide attempt, suicidal ideation and deliberate self-harm)

People who have engaged in past suicide-related behavior are at significantly higher risk of future suicide-related behaviour, including death by suicide, even when other suicide risk factors are accounted for (e.g. mental illness, hopelessness).[36] For example, among those with a mood disorder, rates of completed suicide are higher in those with a previous suicide attempt when compared to those with no suicide attempt history.[37] While it is acknowledged that suicidal ideation does not necessarily translate into suicide attempt or completion, it does constitute a significant risk factor.[38]

Similarly, a previous episode of deliberate self-harm is an important risk factor for future suicide; those presenting to emergency departments for deliberate self-harm were significantly more likely to die by suicide than those in the general population, with suicide rates highest in the six months following the self-harm episode.[39]

3.1.10 People with physical illness

There is some evidence that people who are physically ill are at higher risk of suicide. For example, a systematic review by Catalan et al[40] suggests that there is a high prevalence of suicide-related behaviour in people with HIV. Harris and Barraclough also note a number of physical illnesses that have been associated with suicidal behaviour, including HIV/AIDS, certain types of cancer (head and neck), neurological diseases and some autoimmune diseases.

3.1.11 People bereaved by suicide

In terms of the risk of future suicidal behavior in those bereaved by suicide, a recent meta-analysis has found that children whose parents die by suicide are more likely to die by suicide themselves,[41] and the suicide of a spouse has also been shown to increase the risk of suicide in the surviving spouse.[42] Furthermore, those bereaved by suicide often exhibit higher rates of mental illness compared with those who have not been affected by suicide, which in turn elevates their risk for future suicide-related behaviour. For example, children of a parent who has died by suicide were found to have higher rates of alcohol and substance use, as well as depression, when compared with children whose parents had died of a sudden natural death.[43] Longitudinal research has also found that children bereaved by the

suicide of a parent demonstrate a greater number of anxiety symptoms during the first two years of bereavement compared with children whose parents died of other causes.[44] The loss of a relative to suicide can often elicit complex grief reactions, which include prolonged mourning, and increased depression and anxiety,[45] all of which may increase the risk of suicide in the future.

3.1.12 Prisoners

International data, while acknowledging variation between countries, indicate that rates of suicide among those incarcerated are at least three times higher than rates found in the general population.[46] In addition, those on forensic wards show the highest rates of attempted suicide, compared with other inpatient settings.[47]

Particularly vulnerable groups among prisoners include those with mental illness, history of substance abuse, suicidal ideation and history of suicide attempt.[48] Recent release from prison is also a risk factor associated with suicide; international and Australian data show that suicide rates among the recently released are higher than 'in prison' rates (possibly reflecting access to means) as well as general population rates. These studies also indicate a timing effect, where risk appears heightened in the time period directly following release.[49, 50]

3.1.13 Lesbian, gay, bisexual, transgender and intersex (LGBTI) populations

Reliable information regarding rates of suicide in LGBTI populations is lacking, possibly reflecting the routine absence of reporting of sexual attraction, orientation or identity following suicide.[51] However, a number of international studies have investigated suicide-related behaviour in LGBTI populations. Findings indicate that LGBTI populations experience both suicidal ideation and engage in suicide attempts at higher rates than non-LGBTI populations.[51,52,53,54] Given that ideation and attempt are themselves risk factors for suicide, it is reasonable to assume that LGBTI populations are also at increased risk of suicide.

3.2 Interventions

While there is significant evidence pertaining to suicide rates and risk factors, less evidence exists regarding the effectiveness of specific interventions.[55,56] Evidence about suicide prevention interventions obtained from the Stage 2 Literature Review falls into three contexts:

- Multifaceted interventions spanning universal, selective and indicated approaches ('broad-spectrum' interventions)
- Single intervention types
- Specific interventions delivered in Indigenous populations.

3.2.1 Broad-spectrum interventions

The literature search retrieved four well-conducted reviews examining interventions that spanned the full spectrum of universal, selective and indicated approaches. The earliest of these studies was conducted by Mann and colleagues,[57] who examined 93 studies published between 1966 and June 2005, in order to identify the effectiveness of specific suicide prevention interventions. The interventions examined in

this review were:

- Restricting access to means of suicide
- Guidelines for media reporting of suicide
- Awareness and education programs targeting the general public, general practitioners (GPs) and 'gatekeepers'
- Screening programs
- Treatment interventions, including medication for the treatment of mental disorders, psychotherapy and follow-up care after a suicide attempt.

The outcomes assessed by study authors were completed and attempted suicide and suicidal ideation or, where applicable, intermediate outcomes, such as help-seeking behavior, identification of at-risk individuals, entry into treatment, and antidepressant prescription rate.

Based on the outcomes assessed and the quality of evidence, the authors concluded that overall the most promising interventions were GP education programs focusing upon better detection and treatment of depression, restricting access to means of suicide and gatekeeper training. These are discussed in more detail in the next section.

Beautrais and colleagues[58] looked more specifically at effective strategies in New Zealand. Like the study by Mann et al, this review identified three interventions for which 'strong' evidence pertaining to their effectiveness exists: training for medical practitioners, means restriction and gatekeeper education.

The more recent study by Feltz-Cornelis and colleagues[59] reviewed findings from systematic reviews investigating the effectiveness of interventions for the prevention of suicide, with the aim of identifying evidence-based components that could be included within multilevel suicide prevention strategies. The authors concluded that at least three types of interventions have evidence for their effectiveness. These include training GPs to recognise and treat depression and suicidality, means restriction and improving access to care for at-risk groups (e.g. gatekeeper training and follow up of high-risk groups). These findings reflect those of both Mann et al and Beautrais et al.

Finally, the study by Nordentoft[60] reviewed the available literature around suicide prevention, using the universal, selective and indicated prevention model to classify findings. The author described intervention strategies at each level within the prevention model and, where intervention evidence was lacking, identified risk factors as potential intervention targets.

At the universal level, means restriction was identified as an effective intervention (although levels of evidence were not presented). At the selective level, a lack of evidence for prevention strategies was outlined, however high-risk groups (e.g. those with mental illness, substance misusers, homeless people and prisoners) were identified and potential interventions targeting these groups were alluded to (e.g. education/training strategies for those involved in diagnosis and treatment). At the indicated level, follow up after suicide attempt was noted as an effective strategy for preventing subsequent attempts. Psychological and pharmacological interventions were also described, however no firm conclusions about their effectiveness were presented.

3.2.2 Single intervention types

In addition to the reviews described above, 13 other papers were identified that systematically reviewed one particular type of intervention. Six of these described universal approaches, of which three reviews examined the effectiveness of restricting access to means of suicide,[61,62,63] two described school-based education and awareness programs,[64], [65] and one reviewed media reporting of suicide.[66] Three described selective approaches,[11,67, 68] two described indicated approaches,[69 70] and two described postvention approaches.[71 72]

In addition, six studies were identified that reviewed interventions for a specific at-risk group; of these four reviewed interventions targeting young people,[56 65 73 74] one assessed interventions for the elderly,[11] and one assessed suicide prevention approaches for military veterans.

These individual intervention types are discussed further in the next section.

3.2.3 Interventions in Aboriginal and Torres Strait Islander populations

Three articles retrieved by the current search reported on individual studies of interventions in Indigenous populations. One of these reported on a series of health promotion and awareness-raising initiatives in a rural community in South Australia.[75] The other two reported on aspects of gatekeeper training programs conducted in New South Wales and Central Australia respectively.[76,78]

The first article reported on the development of a series of mental health promotion-type activities that targeted Indigenous communities in rural South Australia. Components of the program focused upon raising awareness of suicide among community members, assisting community members to identify and support people at risk of suicide, delivery of the Applied Suicide Intervention Skills Training (ASIST) program, [77] self-esteem and resilience-building initiatives and leadership and community identity initiatives. The program was subject to a process evaluation, which led the authors to draw conclusions regarding the importance of placing interventions in a relevant sociopolitical context, local relevance, and sustainability. It also enabled them to make a series of 'good practice' recommendations for future projects. However, the article did not report on the actual impacts of the program on any suicide-related outcomes, therefore its ability to provide information regarding the effectiveness of programs such as this on Indigenous suicide rates is limited.

Of the gatekeeper training studies, the first by Capp and colleagues[78] reported on a series of community gatekeeper training workshops delivered to Aboriginal community members in New South Wales. The workshops aimed to increase the ability of members of the Aboriginal community to identify and support people at risk of suicide, as well as facilitate access to relevant services. Workshop participants included community members, students and Aboriginal workers from health, education and youth work backgrounds. The authors report that the program led to an increase in participants' knowledge about suicide, greater confidence in identification of people who are suicidal, and high levels of intentions to provide help, suggesting that gatekeeper training may also be an effective approach among Indigenous communities. That said, as with the other studies reported above, their impact on actual suicide-related behaviour is untested. It must also be noted that this is only one small study that was conducted in a specific area in New South Wales, and the results may not be generalisable to other Indigenous communities across Australia. Further, no follow-up assessment was conducted, and whether or not the changes demonstrated over the course of the workshop were sustained over time is therefore unknown.

The second study employed qualitative techniques to evaluate a training resource specifically developed for use in suicide prevention workshops targeting central Australian Indigenous communities. The

training resource, 'Suicide Story' consists of a DVD that covers a range of topics relevant to many suicide intervention training tools, but also elements specific to Indigenous suicide; it incorporates film, animation, artwork, music and interviews. The aim was to provide a culturally-sensitive approach to increase understanding about suicide, as well as improve gate keepers' skills in working with people at risk. The resource is to be used by skilled trainers in the context of a three and a half day suicide prevention workshop. The development, implementation and evaluation of the resource was underpinned by the philosophy of 'cultural safety', which recognises that the delivery of suicide prevention programs needs to reflect the diversity that exists between Indigenous and non-Indigenous populations, as well as the differences within Indigenous groups, highlighting the need for locally and culturally-specific approaches to suicide prevention. The authors report that the DVD increased trainees' knowledge and confidence to respond to someone at risk of suicide, and that applying the principles of 'cultural safety' in the context of suicide prevention can "lead to initiatives that are more informed, more applicable, and ultimately more effective" (p1).

4 DISCUSSION

4.1 High-risk groups

The review identified a raft of evidence identifying those groups that are at elevated risk of suicide. These correlate to some degree with those identified by the LIFE Framework as being supported by Level A ('strong') evidence. However, as the definition of Level A evidence in the LIFE documentation extends to robust evidence other than systematic reviews and meta-analyses, it is unsurprising that not all were captured in the current review. In addition, the LIFE analysis concentrated on risk factors, rather than at-risk groups, and utilised statistical data in addition to peer-reviewed literature, further accounting for differences.

These LIFE Framework risk factors include family history of suicide and psychopathology, negative life events and low coping potential, marital status (with people who are divorced, widowed, separated and single identified at higher risk), low socioeconomic status and unemployment, and neurobiological, psychological, social and environmental factors.

Interestingly, the current review suggests good evidence for groups not identified in the LIFE Framework being at increased risk of suicide: these include culturally and linguistically diverse populations and LGBTI communities (identified in the LIFE Framework, but with a cited lack of good evidence), youth and current or recent prisoners.

These inconsistencies highlight the need for more robust data collection processes and further research in this area.

4.2 Interventions

4.2.1 Universal approaches

As noted above, universal approaches to suicide prevention target whole populations with the aim of reducing risk factors or enhancing protective factors. The types of universal interventions identified by

the current search include restricting access to means of suicide, guidelines for media reporting of suicide, and school-based suicide education and awareness programs.

Reducing access to means

Restricting access to the means of suicide is a feature of most national suicide prevention strategies, and was highlighted by each of the four papers that reviewed broad-spectrum approaches to suicide prevention as one of the more effective interventions to date.[57-60] Three additional retrieved studies reviewed the literature specific to means restriction as a suicide prevention method.[61-63] These studies add support to the above conclusions that restricting access to means reduces the number of suicide deaths.

The studies by Mann et al and Beautrais et al[58] report that restricting access to certain suicide methods has been shown to reduce the number of suicide deaths by that method, including in the case of firearms, pesticides, medication such as barbiturates and analgesics, compulsory use of catalytic converters in motor vehicles, construction of barriers at jumping sites, and the use of new, lower toxicity anti-depressants. Although the authors acknowledge that substitution of method can occur, restriction of a common means of suicide in a given country can lead to a reduction in the overall suicide rate. For example, this has been the case following the restriction of firearms in parts of North America and Canada, and barbiturate restriction here in Australia. However, restricting common means of suicide may be easier in some cases than others: for example, it may be easier to restrict access to pesticides than to hanging (the most common method of suicide in Australia).5 Furthermore, in order for means restriction to be an effective strategy access to timely and accurate national mortality data is required so that interventions can reflect current trends.

Implementation of media guidelines

The reporting of suicide in the media has the potential to precipitate suicidal behaviour in vulnerable individuals. For example, a recent systematic review by Sisask et al concluded that there was an association between media reporting of suicide and actual suicide. The type of media exposure rather than suicide reporting per se, likely explains the link: sensationalising suicide, explicit descriptions of means and the portrayal of suicide as a legitimate solution to problems by the media may contribute to increasing suicide risk in some vulnerable individuals.[79] Pirkis et al[80] report that media items on suicide are more likely to be associated with suicide if they appear on television rather than radio, and if they report on actual suicide, rather than suicidal ideation or attempted suicide.

Some countries have implemented reporting guidelines in response to these findings, and the reviews by Mann et al and Beautrais et al highlight that reporting guidelines may be used to achieve accurate and non-sensationalist reporting of suicide. Beautrais et al outline that there is potential to work "…collaboratively with media to disseminate factual, accurate evidence and information about suicide and mental health in a non-stigmatising manner and to promote knowledge and information about suicide prevention".

Bohanna et al[81] recently undertook a systematic review assessing evidence for the effectiveness of media guidelines on the reporting of suicide. The authors concluded that guidelines are able to prevent imitative suicide, however the awareness, use and opinion of such guidelines by journalists is generally low. Given this, more training and collaboration between media and mental health agencies is likely to improve the implementation, and thus effectiveness of such guidelines.

Responsible media reporting is a feature of the majority of suicide prevention strategies across the world, including in Australia. However, there remains much to be done to promote responsible and informed media coverage of suicide by maintaining, implementing and promoting the use of existing media resources, and by working collaboratively with media professionals and outlets, around the dissemination of factual information about suicide and mental health (and its prevention) in a non-stigmatising or non-sensationalist manner. There is additional evidence generated by Australian-based researchers who report that the implementation of media guidelines here in Australia has led to an increase in both the number and quality of media reports about suicide,[82] adding more weight to the value of such guidelines.

Awareness programs

Awareness programs were highlighted by each of the four reviews that looked at the broad-spectrum interventions for suicide prevention.[57-60] However, the effect of these programs on rates of suicide is unknown. These programs usually target the general public with the aim of increasing education and awareness of suicidal behaviour and mental illness, improving understanding by recognising established risk factors and reducing stigma by challenging unhelpful perceptions or myths. The overarching aim is to increase treatment seeking, support and recognition for those with suicide risk and mental illness and, by this mechanism, influence suicide rates.

General population education and awareness programs appear somewhat effective in changing attitudes but fall short of translating attitude change into behaviour change. For example studies in the UK, Germany, New Zealand and Australia indicate these programs have some effect on attitudes regarding causes and treatments for depression however they do not appear to reduce suicidal behaviour or increase help seeking.

There is some evidence to suggest that more success may be had with programs that are targeted to specific groups (e.g. adolescents) and with those particularly aimed at suicide prevention as opposed to depression or mental illness more generally. Some have suggested that school-based suicide prevention programs are effective in terms of increasing students' knowledge in relation to suicide. However, within their review, Ploeg and colleagues also note the potential risk for such programs in increasing hopelessness and maladaptive coping behaviours in males specifically. Cusimano and Sameem, in a more recent systematic review of school-based suicide prevention programs concluded that knowledge, attitudes and help-seeking behaviours were increased as a result of such interventions; however, insufficient evidence exists to determine the impact they have on actual suicide rates.

There is limited evidence to support the use of large-scale suicide awareness programs in schools, although the review conducted by Cusimano and Sameem cited above did report some potential benefits of such programs. However, it is worth noting that concerns continue to be expressed regarding the possibility of iatrogenic effects of such programs, particularly among already vulnerable youth.[83] To our knowledge, to date no studies have examined the potential for negative effects, which has led some to recommend that broad-based awareness programs should focus on mental health promotion and not suicide itself, until evidence exists to demonstrate their safety.

4.2.2 Selective approaches

As noted previously, selective interventions target subgroups whose members are not yet manifesting suicidal behaviours, but exhibit proximal or distal risk factors that predispose them to do so in the future.

The types of selective approaches identified in this review are GP education, gatekeeper training and screening programs.

General practitioner education

The relationship between depression and suicide risk is well established.[84,85] In addition, depression is often under-recognised and under-treated by GPs, yet many people who die by suicide have had recent contact with a GP.[86] Thus GP education programs are based on the premise that improving the ability of GPs to identify and treat depression will lead to a reduction in suicide rates. These types of program have been tested in a number of countries around the world and have been shown to lead not only to increases in rates of anti-depressant prescribing, but also (often substantial) decreases in rates of suicide, leading Mann et al to conclude that such education programs 'represent the most striking known example of a therapeutic intervention lowering suicide rates' (p2067).

These programs were also cited by Beautrais et al, Feltz-Cornelis et al and Nordentoft as one of the most effective suicide prevention strategies to date.

Gatekeeper training programs

'Gatekeepers' can include clergy, first responders, pharmacists, geriatric caregivers, and those employed in schools, prisons, sports clubs and the military.

Gatekeeper training was identified as an effective preventative approach by three of the four reviews of broad-spectrum interventions retrieved by the current search.[57, 58,] Two further relevant studies were also retrieved: one reviewed gatekeeper training across all populations,[87] while the second reviewed all school-based interventions (including gatekeeper training programs).[73]

These programs generally focused on raising awareness of risk factors for suicide, increasing confidence and perceived skill when working with at-risk populations, policy changes to encourage help-seeking, improving the availability of resources, and stigma reduction. However, some of these programs (i.e. those conducted in institutional settings such as the Norwegian Army and the US Air Force where the roles of gatekeepers were formalised, and pathways to treatment were readily available) also promoted organisation-wide awareness of mental health and suicide and facilitated access to mental health services. It was these types of programs that reported the greatest level of success in lowering suicide rates. That said, others reported increases in knowledge, confidence and perceived skill when working with at-risk people, however their impact on rates of suicide-related behaviour and overall suicide rates remains unknown.[73, 87]

The current search also retrieved two gatekeeper interventions in Indigenous populations that have been formally evaluated (see 'Interventions in Indigenous populations' below).

It is not clear from the literature exactly which gatekeeper or educational programs are the most effective, or indeed which components of training programs lead to the best results. Therefore specific recommendations cannot be made regarding which programs should be funded. However, together these findings have led both the Senate Inquiry into Suicide in Australia[88] and a more recent Parliamentary Inquiry into Youth Suicide in Australia[89] to recommend an increase in the delivery of gatekeeper training across the country, including in rural and remote areas.

Screening programs

Screening programs generally aim to identify at-risk individuals in order to direct them to appropriate treatment. These programs either directly screen for suicide risk behaviours (e.g. suicidal ideation) or for known associated risk factors (e.g. mental illness). Both Mann et al and Beautrais et al indicate that some success has been noted with both types of screening programs in terms of increasing the number of individuals identified as being at risk. However the effect of screening and increased identification on the prevention of suicide remains unclear. This is highlighted by the findings of a systematic evidence review prepared for the US Preventative Service Task Force,[90] which established that no published studies have yet investigated the effect of suicide screening on actual suicide rates.

Pena and Cane[91] and Robinson et al have both reviewed types of screening programs used to detect adolescents at risk of suicidal behaviour, the latter specifically focusing on those used in a school setting. It was concluded that overall, screening programs are able to successfully identity students who are at risk of suicidal behaviour who may not have otherwise come forward for help. However, more research is needed in order to determine the long term benefits of such programs, the referral pathways subsequently utilised by students, and the take up rate of mental health services as a result of the screening process.

Lapierre et al report that screening for depression is one of the most popular suicide prevention approaches used within elderly populations, although not all programs measured suicide-related outcomes. Oyama and colleagues[92] found that community-based depression screening programs in Japan amongst the elderly are associated with a reduced risk of completed suicide.
While the effectiveness of screening programs requires additional research in various populations and settings, at present there is no evidence to suggest that screening for suicide risk is harmful or increases the risk of suicide or suicidal behavior.[93]

4.2.3 Indicated approaches

As described previously, indicated interventions are designed for people who are identified as already beginning to exhibit suicide-related thoughts or behaviours. Types of indicated approaches identified in the current review are pharmacological interventions, psychological interventions and follow-up care post suicide. While there are approaches that show promise in this area, there is clearly a need for more intervention research that specifically targets people demonstrating suicide-related behaviour, in order to ascertain the effectiveness of these approaches in reducing relevant outcomes in those at risk.

Pharmacological treatment

There has been debate in the literature over the past decade as to whether pharmacological interventions reduce the risk of suicide-related behaviour. A limited number of reviews were identified in the current search that assessed the effect on suicidal behaviour of pharmacological treatments used to treat a variety of mental health disorders, including Major Depressive Disorder (MDD) and Attention Deficit-Hyperactivity Disorder (ADHD).

In the past, concerns were raised about whether the use of Selective Serotonin Reuptake Inhibitors (SSRIs) to treat depression may increase suicidal risk in some patients. The current search identified one study that found that the use of SSRIs by adults may reduce the risk of suicide in this population group,[94] however, this systematic review included observational studies only. Systematic reviews of trials using duloxetine and fluoxetine to treat MDD in adults have found no evidence that the approach

increased the rate of suicidal behaviour or ideation in participants[95,96] and in some cases pharmacotherapy has been associated with greater improvement, and faster resolution of suicidal ideation than placebo.

In children and adolescents, the use of pharmacological interventions to treat suicidal behaviour is even less clear. Recent research has suggested that in children and adolescents, certain classes of drugs (most notably SSRIs) may actually increase this risk.[97] The review by Barbui et al found that SSRIs increase the risk of suicidal behaviour in adolescents, despite observing the opposite trend in adults. In addition, a meta-analysis assessing the effectiveness of paroxetine found a higher incidence of suicidal behaviour in young people aged between 18 and 24 years with MDD specifically, compared with adults over 24 years of age.[98] However, whilst acknowledging that there may be an increase in the risk for suicidal behaviour in the younger population when prescribed SSRIs, Bridge et al conclude that the benefits of medication may outweigh the risks in certain age and chronicity profiles.[99]

Psychological treatment – cognitive behavioural therapy (CBT)

One of the first systematic reviews to assess the effect of CBT on suicidal behaviour was conducted by Van der Sande et al[,69] who investigated randomised controlled trials involving suicide attempters. They found that CBT had a protective effect on future suicide attempts in this population, but noted the large variability in the quality of trials.

Tarrier and colleagues conducted a systematic review and meta-analysis of CBT-based interventions aimed at reducing suicidal behaviour in adults and adolescents, demonstrating that these interventions effectively reduced suicidal behaviour and proximal suicide risk factors. For example, CBT was found to be more effective than minimal treatment and treatment as usual but did not demonstrate superiority to other active interventions. The authors also concluded that interventions aimed directly at reducing some aspect of suicidal behaviour, as opposed to targeting an associated risk factor (e.g. depressive symptoms), are likely to be more successful at reducing specific suicidal behaviour.

Robinson et al conducted a systematic review of interventions aimed at young people with a history of suicide attempt, suicidal ideation or deliberate self-harm. One trial indicated positive findings for CBT when compared to treatment as usual, showing that CBT effectively reduced the incidence of deliberate self-harm and suicidal ideation. While the evidence base for CBT delivered to young people with suicidal behaviour is small, these results indicate that it is a promising intervention strategy.

While it is acknowledged that reductions in measures of depression and suicide-related behaviour do not translate directly to reduced suicide rates, CBT-based interventions appear promising in ameliorating a range of suicide-related behaviours (e.g. ideation, plan, attempt) in those at risk. These effects appear strongest over the immediate to short term following treatment, and to reduce over time.[70] Given that suicidal risk likely fluctuates over time, intervention programs need to consider strategies around follow up and maintenance of treatment gains over the medium to long term. It should also be noted that high-risk suicidal people are frequently excluded from research for a number of reasons,[100] making it difficult to draw conclusions as to the efficacy of a range of indicated interventions, including CBT, on this population.

Follow-up care after suicide attempt

The studies by Mann et al, Beautrais et al and Nordentoft each identified follow-up care as a promising suicide intervention strategy following a suicide attempt, presenting evidence to suggest that it can reduce the number of subsequent suicide attempts and possibly the rate of completed suicide.

Follow-up strategies have the potential to keep high-risk individuals linked with services, facilitate future service access and assist with maintaining adherence to treatment regimes. Components of the follow-up strategies outlined within the reviews have not been fully identified or evaluated, however examples may include regular, brief telephone or letter contact, coordinating follow-up appointments, linking services and providing information about emergency access to mental health care.

4.2.4 Postvention

Postvention refers to a range of strategies that can be delivered following a suicide event, generally targeting individuals or groups who have been affected by, or are in close proximity to a suicide. The aim of these strategies is to reduce the distress experienced in response to a suicide and the risk of suicide contagion.

Szumilas et al reviewed the literature on suicide postvention programs, including school-based, family-focused and community-based programs. The authors examined data evaluating these programs and concluded that there was no protective effect on suicide rates or suicide attempts. However, some program components that had positive effects on knowledge, help-seeking and psychological distress were highlighted, namely gatekeeper training, counseling for survivors and the provision of outreach support at suicide sites.

Cox et al looked specifically at postvention strategies delivered in response to suicide clusters in young people. The results of this review indicate that few evaluations of postvention responses have been conducted, making it difficult to draw firm conclusions about the effectiveness of these strategies on the reduction of suicide risk or completed suicide. However, some promising strategy components were described, including the development of a community response plan, educational/psychological debriefings, provision of both individual and group counseling to affected peers, screening of high-risk individuals, responsible media reporting of suicide clusters and promotion of health recovery within the community to prevent further suicides. The Australian government has recently produced a set of community guidelines[101] that provide assistance to communities who wish to develop and implement a community response plan such as those noted in this review: these represent a new initiative and are yet to be evaluated.

McDaid et al conducted a systematic review of interventions for people bereaved through suicide. They found some evidence for the benefit of a four-session cognitive behavioural family intervention for first-degree relatives and their spouses compared with no intervention. At 13-month follow up, participants reported fewer maladaptive grief reactions, and less perception of being blamed for their relative's suicide.

In addition, Robinson et al reviewed the available literature specific to school-based suicide postvention programs, again noting a considerable lack of evidence pertaining to postvention strategies.

4.3 Interventions in Indigenous populations

Each of the articles retrieved by the separate search for interventions undertaken specifically in Indigenous populations are single studies,[75,76,78] of which two have key methodological limitations.[75,78] This means they are of limited utility in terms of informing suicide prevention initiatives among Indigenous Australians.

In addition, the Closing the Gap Clearinghouse[102] recently released a resource sheet summarising policies and programs aimed at reducing suicide and suicidal behavior. This information captures key learnings from work undertaken specifically in Indigenous populations as well as more generalised programs that may be suitable for adaptation into Indigenous contexts. The Clearinghouse concludes that there is evidence for 'community programs that focus on the social, emotional, cultural and spiritual underpinnings of community wellbeing' in suicide prevention, and that 'a number of effective non-Indigenous-specific programs have been shown to be culturally appropriate and acceptable to Indigenous people'.

It is widely accepted that there are significant differences not only between Indigenous and non-Indigenous suicides, but also between different Indigenous communities,[103,104,105] meaning that interventions that are appropriate for one community may not be for another.[106] This raises questions about the generalisabilty of research findings from any single study. As a result, it has been recommended that a series of 'community-specific strategies' should be developed and evaluated that can respect and accommodate the unique nature of different Aboriginal groups and communities, and that employ appropriate methodological approaches.

4.4 Data availability and study limitations

A number of limitations to the current review need to be taken into account when interpreting the findings. Firstly, the current search was restricted to systematic reviews and meta-analyses, as it was beyond the project's scope to retrieve all articles pertaining to high-risk groups for suicide and suicide-related interventions. However, the systematic reviews conducted in the area of suicide prevention that are highlighted used a thorough methodology and, as such, were likely to have picked up key articles of interest.

Due to time constraints, the only database searched was Medline. However, past experience suggests that this database would have most likely included all the articles that met the inclusion criteria for the current review.

A further limitation relates to the identification of studies reporting on programs designed to reduce the risk of suicide in Indigenous populations: no systematic review articles were retrieved by our search. However, because the level of risk is high among this population and the relevance of this issue to Australia's suicide prevention program, we conducted a separate search that retrieved three articles.

Other limitations exist that are not specific to this review. One such factor is the absence of standardised definitions of the key outcomes of interest and the use of variable terminology and outcome measures across those studies included in the reviews cited here, which can make it difficult to generalise findings across studies.

Further, as has been previously reported,[107,108] there is in general a lack of intervention studies assessing suicide-related outcomes, in particular suicide itself. Although suicide is widely regarded as a significant public health problem, it is, in statistical terms, relatively rare, meaning that in order to conduct

research with suicide as an outcome, very large studies with long follow-up periods are required. As a result, studies are often not adequately powered to measure suicide as an outcome and therefore frequently report on proxy outcomes such as suicidal ideation, suicide attempt and deliberate self-harm, and in some cases help-seeking behavior, identification of at-risk individuals, entry into treatment, and antidepressant prescription rate. Whilst this is not unusual in suicide research there remains a need for large, adequately powered studies that can examine the effects of interventions on rates of suicide.

The issue of sub-optimal data collection and recording processes has been the subject of much discussion in Australia and internationally.[109, 110] In 2010, the Senate Inquiry into Suicide in Australia (*The Hidden Toll: Suicide in Australia*)also raised concerns regarding the accuracy of suicide reporting in Australia and outlined a number of factors that may impede the accurate identification and recording of possible suicides, noting the consequences of any under-reporting for the understanding of risk factors and provision of services to those at risk. The Senate Inquiry recommended a program of reform designed to improve the accuracy of suicide statistics across the country and the timely dissemination of these data, in order that suicide prevention programs can be responsive to current need. The Government responded positively to these recommendations in the Commonwealth Response to *The Hidden Toll: Suicide in Australia*.[111]

5 CONCLUSIONS

The current review highlights those groups for whom the evidence indicates elevated risk of suicide, and those interventions for which the most evidence of effectiveness exists.

While the identification of population subgroups at increased risk of suicide varies according to method, it is clear that targeting these groups most at-risk (as well as relevant 'gatekeepers') forms an important component of a broad-spectrum, multi-faceted approach to suicide prevention, particularly on a national scale.

There is some evidence to suggest that national suicide prevention strategies have the ability to lead to reductions in suicide rates,[112] in particular among certain subsets of the population (namely elderly and young people).[113]. However, it is harder to determine exactly which components of national strategies are the most effective. From this review it can be concluded that the interventions for which the best evidence exists are reducing access to means of suicide, educating general practitioners to better recognise and treat depressive disorders, and gatekeeper training programs. There is also some evidence to suggest that the implementation of media guidelines, screening programs and CBT may be promising.

A lack of relevant data and variations in study design and quality mean that the evidence in this area is often insufficient to prescriptively inform future suicide prevention initiatives. This is particularly true for interventions specifically targeting Indigenous populations.

However, an absence of evidence does not equate to evidence of absence. This observation is supported by the LIFE Framework itself,4 which identifies the need for an expansion of the evidence base regarding suicide prevention. The Senate Inquiry into Suicide in Australia and the Parliamentary Inquiry into Youth Suicide both also called for a national program of funding for research into suicide prevention, including detailed evaluation of suicide prevention interventions and the development of a coordinated and targeted program of research into this area respectively. A specific program of

research that can develop and test interventions designed to reduce suicide risk among Australia's Indigenous population, and using culturally appropriate methodologies, is also clearly warranted.

For all of these reasons, and because suicide is multi-faceted and complex, it is widely agreed that suicide prevention activities need to be broad-based, reflecting the full spectrum of approaches, including universal, selective and indicated interventions.[57,58,59,60] The evaluation of the NSPP, informed in part by this literature review, will be a key process in ensuring that future national suicide prevention strategies are based, as far as possible, on evidence of effectiveness for individual components and the strategy as a whole.

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