McMaster University

McMaster HEALTH FORUM

IDENTIFYING SUICIDE-PREVENTION INTERVENTIONS

RAPID SYNTHESIS (30-DAY RESPONSE)

30 JUNE 2014

EVIDENCE >> INSIGHT >> ACTION

Rapid Synthesis:
Identifying Suicide-prevention Interventions

30 June 2014

McMaster Health Forum

For concerned citizens and influential thinkers and doers, the McMaster Health Forum strives to be a leading hub for improving health outcomes through collective problem solving. Operating at regional/provincial levels and at national levels, the Forum harnesses information, convenes stakeholders, and prepares action-oriented leaders to meet pressing health issues creatively. The Forum acts as an agent of change by empowering stakeholders to set agendas, take well-considered actions, and communicate the rationale for actions effectively.

Authors

M. Mustafa Hirji, MD MPH, Resident Physician, Public Health & Preventive Medicine, Department of Clinical Epidemiology & Biostatistics, McMaster University.

Michael G. Wilson, PhD, Assistant Director, McMaster Health Forum, and Assistant Professor, McMaster University

Karima Yacoub, MSW, Research Assistant, McMaster Health Forum & Centre for Health Economics and Policy Analysis, McMaster University.

Aunima Bhuiya, Research Assistant, McMaster Health Forum.

Timeline

Rapid syntheses can be requested in a three-, 10-or 30-business day timeframe and this synthesis was prepared over a 30-business day timeframe. An overview of what can be provided and what cannot be provided in each of the different timelines is provided on McMaster Health Forum's Rapid Response program webpage (http://www.mcmasterhealthforum.org/policymakers/rapid-response-program).

Funding

The Rapid Response program through which this synthesis was prepared is funded by the Government of Ontario (through a Ministry of Health and Long-Term Care Health System Research Fund grant entitled Harnessing Evidence and Values for Health System Excellence). This particular rapid synthesis was funded by Toronto Public Health, and through the above-noted grant from the Government of Ontario. The McMaster Health Forum receives both financial and in-kind support from McMaster University. The views expressed in the rapid synthesis are the views of the authors and should not be taken to represent the views of Toronto Public Health, the Ministry of Health and Long-Term Care or McMaster University.

Conflict of interest

The authors declare that they have no professional or commercial interests relevant to the rapid synthesis. The funder played no role in the identification, selection, assessment, synthesis or presentation of the research evidence profiled in the rapid synthesis.

Merit review

The rapid synthesis was reviewed by a small number of policymakers, stakeholders and researchers in order to ensure its scientific rigour and system relevance.

Acknowledgements

The authors wish to thank John Lavis for reviewing a previous draft of this synthesis. We are especially grateful to Anne Bowlby, Heather Bullock, Nisha Menon and Tim Wall for their insightful comments and suggestions.

Citation

Hirji MM, Wilson MG, Yacoub K, Bhuiya A. Rapid Synthesis: Identifying Suicide-prevention Interventions. Hamilton, Canada: McMaster Health Forum, 30 June 2014.

Product registration numbers

ISSN 2292-7980 (print)
ISSN 2292-7999 (online)

KEY MESSAGES

Question

- What are effective strategies for preventing suicide?

Why the issue is important

- Suicide has consistently been among the top five to 10 causes of death in North America, is the second leading cause of death for those aged 10 to 19 and 15 to 34 (preceded only by accidents), and was the ninth leading cause of death overall in Canada in 2011.
- Death by suicide affects some groups more than others with those living with mental illness and/or addictions, people who are socio-economically disadvantaged, First Nations, Inuit and Métis populations, men and boys, and persons identifying as lesbian, gay, bisexual and transgender (LGBT) all with higher rates of death by suicide.
- Suicide prevention is challenging given that risk factors interconnect at the individual, interpersonal, community and societal levels, and therefore, programs and services must tease out the complexity of these while also being tailored to differences in age, gender and cultural groups.

What we found

- We found 95 systematic reviews covering suicide prevention across five domains: universal interventions (n=15), interventions targeted at selective *population groups* (n=31), interventions 'indicated' for those *individuals* at highest risk for suicide (n=24), interventions to treat persons who are actively suicidal (n=51), and interventions to maintain improvements after successfully reducing suicidality (n=3). Few reviews are of high methodological quality (n=18) with most being either medium (n=43) or low quality (n=34). The majority of reviews (n=63, 66%) have been done in the last five years (since 2009).
- From reviews with high-quality methods, we found that:
  - treating underlying mental health disorders (including substance use issues) with either pharmacotherapy or psychotherapy (including cognitive behavioural therapy) reduces suicide risk, and that ongoing follow-up after successful treatment helps to maintain the improvement in risk;
  - intensive care management and community mental health teams are promising community interventions for reducing hospitalization and deaths by suicide attempts; and
  - screening for suicide has been found to be effective at identifying those at-risk, but it also yields many false positives.
- In medium- and lower-quality reviews, we found that:
  - programs targeted at specific high-risk communities (in particular, those for students, military and veterans, and indigenous communities) and/or tailored to specific cultures (e.g., indigenous communities) have often, but not universally, been effective;
  - being exposed to suicide is a risk factor for an individual becoming suicidal, and one of the effective universal interventions addresses this by restricting media reporting of suicides (though evidence for persistence of this effect over the long term is conflicting).
  - peer-education interventions for those who have been exposed to an individual who died by suicide have often been effective (but have sometimes been associated with increases in suicide), whereas other postvention interventions (i.e., those addressing populations exposed to an individual who died by suicide) have paradoxically often been associated with increases in suicide and rarely with decreases;
  - restricting access to the means and tools (e.g. weapons) to commit suicide and national suicide prevention programs also reduce suicide risk, but access restrictions can lead to suicidal individuals choosing alternate means for suicide;
  - training of peers, particularly as gatekeepers, to better understand suicide, recognize signs of suicide in peers, and to intervene accordingly are protective for high-risk individuals; and
  - providing assistance to family physicians with treatment guidelines and to facilitate coordination of services in their community are promising interventions.

QUESTION

What are effective strategies for preventing suicide?

WHY THE ISSUE IS IMPORTANT

Suicide has consistently been among the top five to 10 causes of death in North America, but it has not received comparable levels of attention as other public health problems that account for far fewer deaths annually.(1) Specifically, suicide was the second leading cause of death for those aged 10 to 19 (2) and 15 to 34 (preceded only by accidents),(3) and was the ninth leading cause of death overall in Canada, in 2011.(4) In 2011, the age-standardized rate of death by suicide was 10.1 per 100,000 people,(5) which represents a total of approximately 3,728 deaths from suicide that year and is equivalent to more than 10 people dying by suicide each day. Rates of death by suicide vary across provinces and territories, ranging from 5.1 per 100,000 in Yukon to 57.1 per 100,000 in Nunavut.(6) Ontario also has one of the lowest rates of death by suicide in the country (8.5 per 100,000), and the rate for men in Ontario (13.0 per 100,00) is much higher than for women (4.2 per 100,000).(6)

According to the World Health Organization (WHO), rates of death by suicide have increased by 60 per cent worldwide in the last 45 years.(7) In Canada, overall rates (i.e., not age-standardized) of death by suicide have shown a gradual increase since the mid-1950s (when the rate was 7.1 per 100,000 citizens), coming to a peak in 1980 (15.1 per 100,000 citizens) before stabilizing and declining somewhat towards 2009 (11.5 per 100,000 citizens), which reflects the worldwide trend found by WHO.(8;9) However, death by suicide continues to disproportionately affect certain groups with higher rates of death found among those with mental illness and addictions (a major mental disorder is present in 90% of deaths by suicide and suicide attempts),(10;11) people who are socio-economically disadvantaged,(12-14) First Nations, Inuit and Métis populations,(5;6;15-20) men and boys,(5) and members of the lesbian, gay, bisexual and transgender (LGBT) community.(21-24)

Suicide prevention is challenging given that programs and services need to address a complex interplay of factors at the individual, interpersonal, community and societal levels in ways that are appropriate for different age, gender and cultural groups.

Box 1: Background to the rapid synthesis

This rapid synthesis mobilizes both global and local research evidence about a question submitted to the McMaster Health Forum's Rapid Response program. Whenever possible, the rapid synthesis summarizes research evidence drawn from systematic reviews of the research literature and occasionally from single research studies. A systematic review is a summary of all studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select and appraise research studies, and to synthesize data from the included studies. The rapid synthesis does not contain recommendations, which would have required the authors to make judgments based on their personal values and preferences.

Rapid syntheses can be requested in a three-, 10-or 30-business-day timeframe. An overview of what can be provided and what cannot be provided in each of these timelines is provided on the McMaster Health Forum's Rapid Response program webpage (http://www.mcmasterhealthforum.org/index.php/stakeholders/rapid-response)

This rapid synthesis was prepared over a 30-business-day timeframe and involved five steps:

1) submission of a question from a health-system policymaker or stakeholder (in this case, Toronto Public Health);
2) identifying, selecting, appraising and synthesizing relevant research evidence about the question;
3) drafting the rapid synthesis in such a way as to present concisely and in accessible language the research evidence; and
4) finalizing the rapid synthesis based on the input of at least three merit reviewers.

WHAT WE FOUND

We identified 95 systematic reviews evaluating suicide-prevention interventions in Canadian and international sources (see Table 1 for a summary of the quality of included reviews and when they were conducted). The systematic reviews cover topics related to the full spectrum of suicide-prevention efforts that Scott and Guo (2012) outline in their overview of reviews (see Table 2), which include three interrelated sets of activities: prevention, treatment and maintenance.(25) We provide below a brief explanation of each of the sets of activities, followed by a summary of key findings from systematic reviews. We provide more details about each systematic review in Appendices 1-3.

Prevention refers to a wide range of measures to reduce the likelihood of suicide and other suicide-related behaviours within the community.(26) Prevention efforts can vary in scope and could be universal (i.e., targeting the general public or whole populations that have not been identified on the basis of individual risks), selective (i.e., targeting individuals or population subgroups whose risks of suicide-related behaviours are higher than average), or indicated (i.e., targeting high-risk individuals who have been identified as having minimal but detectable signs or symptoms of suicide-related behaviours).(25) Prevention can also be defined in the context of levels, such as primary (i.e., reducing the number of new cases of suicide or suicide attempt), secondary (i.e., decreasing the likelihood of a suicide attempt in high-risk individuals) and tertiary (i.e., diminishing the consequences of suicide attempts).(27) These efforts can also encompass a broad range of strategies including postvention (supporting families and communities after a suicide attempt or suicide in order to cope with the event, to reach closure, and to reduce the impact of suicide-related behaviours)(26) and strength-based approaches that focus on celebrating assets and building capacity and resiliency to promote positive outcomes and reduce negative outcomes. *Treatment* refers to interventions targeting individuals who are currently suffering from a diagnosable disorder and are intended to cure a mental health disorder or reduce the symptoms or effects of the disorder.(25) Finally, *maintenance* refers to supportive, educational and/or pharmacological interventions that are provided on a long-term basis to individuals who have serious and persistent mental health illness.(28)

Box 2: Identification, selection and synthesis of research evidence

We included all systematic reviews that were previously identified in an evidence brief that was published in 2012, which contained reviews from three previously published overviews of systematic reviews of suicide-prevention interventions. In addition, we conducted searches in May 2014 to update those that were conducted as part of an evidence brief. This included searching: 1) Health Systems Evidence using the term suicid*; 2) Health Evidence using the category for suicide under the focus of the review; 3) Database of Abstracts of Reviews of Effects using the term suicid*; and 4) Medline for suicide* and prevent* (filtered using the search hedge to optimize the retrieval of systematic reviews). All searches were limited to records published since August 2012, which was when the previous searches were conducted.

The results from the searches were assessed by two reviewers for inclusion. A systematic review was included if it fit our minimum standard for a systematic review (at least two databases searched and used explicit criteria to select studies for inclusion), and evaluated the effects of one or more suicide-prevention interventions.

For each review we included in the synthesis, we documented the focus of the review, key findings, last year the literature was searched (as an indicator of how recently it was conducted), methodological quality using the AMSTAR quality appraisal tool (see the Appendix for more detail), and the proportion of the included studies that were conducted in Canada. We then used this extracted information to develop a synthesis of the key findings from the included reviews and primary studies.

Table 1: Summary of the quality* of included reviews and when they were conducted

Last year the literature was searched	High quality (n=18)	Medium quality (n=43)	Low quality (n=34)
2011-2014	7	17	19
2008-2010	7	14	7
2005-2007	1	4	2
pre-2005	3	8	6

* Reviews were assessed for quality using the AMSTAR quality appraisal tool, which rates overall quality on a scale of 0 to 11 with 8-11 being high quality, 4-7 medium quality and 0-3 low quality.

Table 2: Suicide-prevention interventions (table adapted from Scott and Guo 2012)(25)

Intervention category†		Interventions
Prevention	Universal	• Media-reporting restrictions • Means-access restrictions • National suicide-prevention programs • Public messaging
	Selective	• Suicide-prevention centres • Community-based suicide-prevention programs • School-based suicide-prevention programs • Workplace-based suicide-prevention programs • Prison-based suicide-prevention programs • Programs for veterans and military personnel • Drug misuse programs
	Indicated	• Training and peer education • Providing assistance to general practitioners and health service planners • Providing assistance to family/friends of high-risk individuals • Telephone-based suicide-prevention services • Assistance to family/friends of high-risk individuals • Postvention
Treatment	Screening (case identification)	• Ongoing contact • Crisis cards (which are often used for people with mental illness and which list information to support others in providing help during a crisis) • In-patient shelter • Compliance/adherence management
	Standard treatment for known disorders	• Cognitive behavioural therapies • Psychosocial interventions • Psychotherapy • Intensive care plus outreach • Home-based therapy • General hospital admission • Inpatient-based therapies • Outpatient-based therapies • Neurosurgery • Pharmaceutical interventions • Electroconvulsive therapy • Multifaceted interventions
Maintenance	Compliance with long-term treatment	• Ongoing contact • Crisis cards • Inpatient shelter • Home-based therapy • Compliance management • Motivational interviewing
	Aftercare	• Long-term therapy • Service restructuring and case management

Prevention

Universal interventions

The 16 systematic reviews related to universal interventions that we identified evaluated media-reporting restrictions (n=3), means-access restrictions (n=12), national suicide-prevention programs (n=1), public messaging (n=1), and other interventions (n=1). These systematic reviews found benefits for each of the first three interventions, but limitations were also reported.

Media-reporting restrictions are strongly associated with reductions in death by suicide and suicidal behaviour. However, there is conflicting evidence about whether these benefits persist in the long-term. Means restrictions (i.e., limiting access to lethal means used for suicide) have been found to significantly reduce death by suicide. However, increases in death by suicide by other means has been found after restricting access to others, implying partial substitution and thereby diminishing the effects of this type of intervention. All three interventions have been found to affect subpopulations differently with gender being a particular modifier (e.g. media reporting of a suicide death affects individuals of the same gender as the victim; means-access restrictions are more effective at deterring women from suicide, while men are more likely to substitute for a different means). Costs are not well-reported, but instituting media-reporting restrictions requires investing in staff re-training and managing reporters who are not supportive of infringement on the free press.

Other universal interventions include hosting international sporting events which were shown to be ineffective in a high-quality review, and in public messaging which may affect help-seeking, but the evidence is conflicting and the quality of reviews is low. Harms and costs with these two interventions have not been reported.

Table 3: Summary of key findings from systematic reviews regarding universal interventions for suicide prevention

Intervention	Key findings		
	Benefits	**Harms**	**Costs**
Media-reporting restrictions	• Sharp reductions in death by suicide, as high as 75%, have been found after the introduction of media restrictions for reporting of suicides (29;30) • Media restrictions are associated with decreases in headline mentions of suicide; glorification or sensationalized text and headlines; detailed descriptions of suicidal acts; use of graphics; and references to celebrity status of victims (29) • The internet is often a high-risk factor for socially isolated and susceptible individuals who are difficult to reach in other ways; therefore, restricting their exposure to information about suicides may yield large benefits (31)	• Some studies have shown a paradoxical increase in stories about suicide (29) • In general, the influence of media on behaviour varies by age and gender, and so the effect of the media in provoking or deterring suicide are expected to vary by age and gender as well (30)	• Time and resources are required to manage reporters who may not be supportive of guidelines (29) • Organizational training of media staff is needed to create awareness of restrictions and optimize usage (29)
Means-access restrictions	• Means-access retractions have been widely found to be effective (32-41) • Restricting alcohol purchasing (including tax and price regulations), pharmaceutical access (both over-the-counter and prescription-only), pharmaceutical dispensing (limits on volume, requiring blister packs), and car exhaust (through requiring catalytic converters) decrease suicide attempts and deaths by those	• Although some studies have found reductions to persist as long as five years after means restrictions are instituted, other studies have found a regression to pre-intervention levels (29)	None reported

	causes, though the causal link is disputed in some cases (33;40) • The effects of firearms restriction is unclear (32) • Means-access restrictions are most effective at limiting suicide by very lethal means (36;42) or by alcohol-related mortality (39)	• May decrease means-specific suicides but increase suicides by other means (43) • Restrictions on certain pharmaceuticals may shift use to other pharmaceuticals (40) • Are more effective in females than males as males are more likely to substitute for alternate means (44)	
National suicide-prevention programs	• No reviews identified	• No reviews identified	• No reviews identified
Public messaging	• One study found a reduction in perceived barriers to accessing help, and an increase in help-seeking,(45) but other studies have not corroborated this finding.	None reported	None reported
Other	• One review evaluated the effects of hosting the Olympic Games on rates of death by suicide and found no effect.(46)	None reported	None reported

Selective interventions

We identified 31 systematic reviews that evaluated selective interventions, including suicide-prevention centres (n=1), community-based suicide-prevention programs (n=8), school-based suicide-prevention programs (n=19), programs for veterans and military personnel (n=4), and drug misuse programs (n=1) (see Table 4). No reviews were identified for prison-based or workplace-based program interventions. One low-quality review reported some evidence that programs at suicide-prevention centres led to reduced suicidal urgency and reduced suicidal ideation.(32) There were mixed results on the effectiveness of community-based suicide-prevention programs, but the interventions that appeared most promising were management teams. This included intensive care management and community mental health teams (CMHT) for reducing hospitalization,(47;48) CMHTs for reducing the rate of death by suicide,(42;48) and screening programs and health education for reducing the risk of suicide among older adults.(49) In addition, a medium-quality review of community prevention interventions for indigenous populations found that community-based interventions, training gatekeepers (i.e., people who have primary contact with those at risk of suicide, and who can identify them by recognizing suicidal risk factors) (77) to recognize and intervene with suicidal peers, and culturally-tailored education are all potentially effective.(50)

Systematic reviews evaluating school-based suicide-prevention programs generally demonstrate positive outcomes and attitudes with adolescents,(32;51-59) however, the effects of these interventions on suicide rates is not known.(56) Two reviews (one low and one medium quality) evaluated programs for veterans and military personnel and found that promising interventions included screening in medical settings, organizational military-specific interventions,(37) and training officers and other service members.(60) Training officers and other service members was found to be especially effective when combined with other interventions. However, another medium-quality review found a lack of clear evidence about which interventions were most effective, and suggested that clinicians should consider which interventions are likely to be effective based on the prior conditions of the veteran or military personnel.(61) Lastly, a high-quality review that evaluated problem drinking (as a drug misuse program), found that telephone aftercare contact, brief physician meeting with a follow-up call, rehabilitation programs, and motivational interventions appeared effective (but statistically significant effects were not observed).(62)

The reported potential harmful effects from interventions included: curriculum for school-based suicide-prevention programs having negative effects among adolescent males;(59;63) difficulty with generalizing findings from civilian-targeted literature about mental health and suicide-prevention interventions to veterans and military personnel;(37) and an increase in death by suicide in two trials evaluating problem-drinking interventions.(62)

While most reviews did not report on cost-effectiveness or found limited cost-related information, there is some evidence suggesting that community-based management teams are a cost-effective approach.(42)

Table 4: Summary of key findings from systematic reviews regarding selective interventions for suicide

Intervention	Key findings		
	Benefits	**Harms**	**Costs**
Suicide-prevention centres	• A low-quality review found some evidence that of three programs evaluated at suicide-prevention centres, one led to reduced suicidal urgency, and another to reduced suicidal ideation (32)	• None reported	• None reported
Community-based suicide-prevention programs	• Findings are mixed due to the limited studies on community-based suicide-prevention programs • Community-messaging interventions showed some promise with: o seven studies in one review reporting positive messages from internet forums that encouraged at-risk individuals to seek assistance from healthcare providers (64) o one review finding some improvement in citizens' knowledge of depression or suicide through public awareness programs in specific communities (65) • Management teams such as intensive care management CMHTs may reduce hospitalization,(47;48) and two reviews found that CMHTs are superior to standard care for promoting greater acceptance of treatment, and reducing hospital admission and deaths by suicide (42;48) • Including screening programs and health education in prevention programs is associated with reduced risk of death by suicide among older adults (49) • A review evaluating community-prevention initiatives in indigenous communities found that they have reduced suicide and suicidal behaviour, or have increased protective factors, and that: o gatekeeper training increases knowledge, confidence and intentions to help those who are suicidal (66) o culturally-tailored educational programs reduce hopelessness and suicidality, and increase knowledge of risk behaviours, however, these changes are not always statistically significant (66)	• Risks related to the internet include it being a source to learn about suicide and self-harm, and that cyber-bullying may increase rates of attempted suicide or self-harm (64)	• There is some evidence to suggest management teams (i.e. CMHT) are cost-effective (42)
School-based suicide-prevention programs	• Reviews generally found that school-based suicide-prevention programs improved outcomes or attitudes, but most studies indicate there is limited evidence to establish or evaluate the effectiveness of the interventions (32;51-55;57-59) • One review found that there is currently no evidence linking school-based prevention programs to reduced rates of suicide (56) • One review found that screening programs can be useful to	• School-based curriculum on suicide prevention for adolescents found negative effects among males (59;63)	• There is a lack of evidence on cost-effectiveness (54)

	identify at-risk individuals,(67) and another found reductions in suicide attempts in youth, but there was a lack of conclusive evidence about the effectiveness of screening for the reduction of suicidal behaviour (56) • Two reviews found positive outcomes when long-term 'whole-school approaches' actively involved the school staff, students, parents and local support,(63;68) rather than those of short duration, which were found to be less successful (68;69) • Two reviews found promising interventions at the individual level which included individual psychotherapy (53;70)		
Workplace-based prevention programs	• No reviews identified	• No reviews identified	• No reviews identified
Prison-based prevention programs	• No reviews identified	• No reviews identified	• No reviews identified
Programs for veterans and military personnel	• A low-quality review found some evidence to suggest that screening in medical settings for depression, post-traumatic stress disorder, and high-risk drinking was more effective than ordinary care, and that organizational military-specific interventions have been shown to mitigate the effects of work stress on mental health and possibly suicidality (37) • A medium-quality review found a lack of clear evidence about which interventions were most effective and suggested that clinicians should consider which intervention is likely to be effective based on the prior conditions of the veteran or military personnel (61) • One review found that training of all service members reduced deaths by suicide, especially when training was done in combination with other interventions (60) • One study included in the same review found that the training of officers led to a lower rate of death by suicide than in the comparison group, but many possible confounding factors were identified (60)	• Mental health screening in military organizations has been controversial in some instance and some studies have found it to be effective while others suggest that it may have a negative impact on seeking help (37) • Caution should be used with generalizing findings from civilian-targeted literature about mental health and suicide-prevention interventions to veterans and military personnel (37)	• One review reported that there is limited information related to costs (61)
Drug-misuse programs	• Three trials of interventions for problem drinking showed reductions in death by suicide after the intervention (brief physician intervention with follow-up telephone call, rehabilitation program, and motivational intervention), though these were small and not statistically significant (62) • One study evaluating a program for problem drinking reported a reduction in suicide attempts following telephone aftercare contact (62)	• One trial found a small increase in suicide after a brief physician intervention (62)	• None reported

Indicated interventions

We found 24 systematic reviews evaluating indicated interventions that involve training and peer education (n=11), providing assistance to general practitioners and health service planners (n=4), providing assistance to family and friends of high-risk individuals (n=3), postvention (n=7), telephone-based services (n=5), and mobile device prevention services (n=1) (see Table 5). None of these reviews were found to be of high

quality. Medium- and low-quality reviews indicated that interventions involving training, peer education and assistance to general practitioners are promising in the reduction of suicidal behaviour and suicide rates in high-risk individuals. Specifically, reviews assessed interventions such as gatekeeper training, psychosocial education, and training and educating teachers, students, general practitioners and military personnel.(41;45;60;71) One review found that knowledge and attitude about suicide were improved through gatekeeper training and community programs,(65) but two reviews indicated that there is a lack of evidence on their effectiveness for reducing suicidal behaviour.(65;71) One low-quality review indicated potential harmful effects from gatekeeper training, which included a reduction in help-seeking behaviour.(45) Two other low-quality reviews (one recent and one older) found that providing assistance to general practitioners, health service planners, and family or friends of at-risk individuals to be effective in reducing suicidal behaviours.(72;73)

None of the identified reviews provided information on the costs of the interventions apart from an older low-quality review indicating that training provided to general practitioners may decrease hospital-care costs.(73) A low-quality review found mixed results on the effects of school-based suicide postvention.(74;75) There is limited evidence to determine the benefits, costs and harms of telephone or mobile-based suicide prevention services.

Table 5: Summary of key findings from systematic reviews evaluating indicated interventions

Intervention	Key findings		
	Benefits	**Harms**	**Costs**
Training and peer education	• Interventions identified as promising (but often having some mixed findings) included: o psychosocial education interventions;(76) o training for several groups (students in need, individuals identified as having primary contact with those at risk of suicide, teachers and students, general practitioners, community facilitators, veterans, military officers service members, (41;45;60;71;77) o school-based prevention programs that include a training component, as well as programs and skills training targeted specifically to high-risk students;(53;71) • Psychoeducational programs generally do not increase help-seeking behaviour in youth, but combining it as part of multimodal interventions such as screening seems to have a possible effect on help seeking (45) • Education of physicians in depression recognition and treatment, and in restricting access to lethal means were able to reduce suicide rates (35) • In a review of suicide programs for Canadian youth aged 10-24, six out of nine school programs led to improvements in knowledge on suicide, one led to improvements in attitudes about suicide, and three led to improvements in skills required to intervene in the suicidal process (32) • The same review found that one of the three suicide-prevention centre programs led to a reduction in suicidal urgency, while another of the three led to reduction in suicidal ideation (32)	• One review identified studies indicating that gatekeeper training either had no improvement or decreases in help-seeking behaviour by students, peers and parents (45) • One review found some evidence to suggest that programs to enhance knowledge about suicide and mental health issues may disturb high-risk youth and make them more prone to suicidal behaviour, especially if there is a lack of access to care (41)	• None reported
Providing assistance to general practitioners or	• Training physicians to provide specific depression management led to a significant reduction in suicidal ideation among older adults, but was limited to those with major depression and effects were greater in women (78)	• Psychometric screening tests were not seen as helpful for	• A systematic review found one study indicating that

health service planners	• Practice management guidelines were not effective nor were emergency department management strategies to provide psychosocial assessments (34)	primary care practitioners in assessment of youth at risk of suicide (73)	training general practitioners to respond to youth at risk of suicide decreased drug and hospital-care costs (73)
Providing assistance to family/friends of high-risk individuals	• Person-to-person interventions delivered to parents and caregivers that are aimed at modifying adolescent risk and protective behaviours, are effective at reducing adolescent risk behaviours and yield improvements in overall adolescent health (72)	• None reported	• None reported
Postvention	• Inconsistent positive effects have been found across reviews evaluating approaches to postvention (71;74;75;79)	• Negative effects of school-based suicide postvention have been observed (74;75)	• None reported
Telephone-based suicide-prevention services	• One longitudinal study included in a review found significantly fewer suicides by users of telephone hotlines and emergency services (80) • One qualitative study found telephone-based suicide-prevention services to be helpful for non-chronic suicidal callers (34)	• None reported	• None reported
Mobile device-prevention services	• No reviews identified	• No reviews identified	• No reviews identified

Treatment

Screening (case identification) and standard treatment for individuals with mental illness

We identified 51 systematic reviews addressing treatment, which included screening (n=12), pharmaceutical interventions (n=15), intensive care combined with outreach (n=1), general hospital admission (n=1), cognitive behavioural therapy (n=12), inpatient-based therapies (n=1), outpatient-based therapies (n=1), home-based therapies (n=1), psychosocial interventions (n=18) and multifaceted interventions (n=8) (see Table 6).

Screening has been reviewed in one high quality review and several medium- and low-quality reviews. Screening tests for suicide are generally very sensitive, and in older adults have been useful components of a treatment program. Screening, however, has poor specificity yielding many false positives. Distress and harms from screening are infrequently reported, but their severity has been found to be minimal where they have been observed. The cost of screening was not reported in any of the reviews.

There is a wealth of research evidence in low-, medium-, and high-quality systematic reviews indicating that pharmacotherapy and psychotherapy (including cognitive behavioural therapy) are effective at preventing death by suicide in those with underlying mental illness. The benefit of pharmaceuticals outside of a psychiatric diagnosis is unclear, but psychotherapy has been found to still have some value, though some studies have shown a paradoxical increase in death by suicide. Combining pharmacotherapy with psychotherapy has not yielded improved outcomes as compared to using only one modality. Psychosocial interventions have had variable impacts, with the type of psychosocial intervention used seeming to have a large impact on the effects observed. The costs of these interventions have not been well-studied, though psychosocial interventions may be cost-saving.

In medium and high quality reviews, hospitalization, in-patient treatment, and intense community-based care (e.g. home visits) have generally shown no benefit or reduced cost as compared to outpatient treatment. The exception to this is psychiatric patients who may need more intensive help and may benefit from hospitalization. Suicidal patients may also need intense support during the transition from the emergency department to outpatient care in order to ensure no recurrence of suicidality.

There are currently no reviews of evidence for more invasive treatments such as electroconvulsive therapy and neurosurgery.

Table 6: Summary of key findings from systematic reviews regarding treatment interventions for suicide prevention

Intervention	Key findings		
	Benefits	**Harms**	**Costs**
Screening (case identification)	• Screening instruments have moderately good but variable performance: generally, in adolescents, sensitivity (i.e., the ability to identify those at-risk) is good (as high as 0.80 in some cases), but specificity (i.e., the ability to correctly identify those not at-risk) is poor to moderate (usually below 0.80 and as low as 0.40);(71;79;81) screening in adults in contrast performed better than in adolescents, and in a few cases has sensitivity and specificity above 0.95 • Universal prevention programs with health education follow-up reduce the risk of suicide in older adults (65 years of age and older) (49;82) • Some studies show a reduction in suicide attempts after screening, though many others do not (56;83) • Screening has also been found to be effective in school-based settings if systems for crisis management or a case manager are in place, and screening identifies at-risk students who would otherwise not be identified (67;69;71;79)	• There may be gender differences in the effectiveness of the intervention, with the direction of these differences varying according to several factors (49;82) • Screening in schools generally has low specificity with many false positives and negatives, though distress caused by screening is low (67) • No serious adverse effects of screening have been reported in reviews (83)	• None reported
Treatment • Pharmaceutical interventions	• Treatment of unipolar and bipolar I and II disorders can reduce suicide attempts and death by suicide, and lithium treatment has been shown to reduce both suicide attempts and death by suicide, but it is not significantly better than other active pharmaceutical therapies (84-86) • Several high quality studies in one review showed suicidal ideation was reduced after treatment of depression by fluvoxamine, sertraline, or moclobenide, however, other studies found limited effects (34) • General antidepressant therapy has been shown to be effective in some reviews but not in others,(34;60) and it was found to be rapidly effective in elderly adults for reducing suicidal ideation, but in other high-risk groups, suicidal ideation was slower to resolve (78) • The use of depot flupenthixol to reduce self-harm has been shown to be a promising treatment, but there is a lack of strong evidence to determine whether pharmacotherapy reduces self-harm more generally (87) • Anti-psychotics, valproate and lamotrigine are not suitable for acute treatment of suicidality (88)	• None reported	• None reported

Treatment • Electroconvulsive therapy	• No reviews identified	• No reviews identified	• No reviews identified
Treatment • Neurosurgery	• No reviews identified	• No reviews identified	• No reviews identified
Treatment • Intensive care plus outreach	• The only study included in one systematic review about Emergency Department (ED)-based intervention found that it was effective at increasing treatment adherence (89) • One of six studies included in the same review on post-ED interventions found increased adherence with service referral for those who received community nurse home visits compared to simple placement referral at discharge (89) • All three ED-transition intervention studies in this review reported reduced risk of subsequent suicide, reduced suicide-related hospitalizations, and increased likelihood of treatment completion (89)	• None identified by the included review (89)	• None identified by the included review (89)
Treatment • General hospital admission	• Targeted hospitalization of those with a psychiatric diagnosis is effective,(41) but more generally, hospitalization of other populations is no more effective as compared to outpatient treatment in terms of repeat suicidal behaviour or other symptoms (90)	• Not reported	• Not reported
Treatment • Cognitive behavioural therapies	• Reviews evaluating cognitive behavioural therapies have found a strong statistically significant effect on reducing suicidal behaviour in adults, repeat suicide attempts, and self-harm,(34;53;91-93) and similarly positive results have been found for older adults (78) and emergency department attendees (34) • Strong evidence shows that individual and group cognitive behavioural therapy reduces psychological harm in symptomatic children and adolescents exposed to trauma (93) • Only one study has found a benefit for adolescents in reducing suicidal ideation, suicide attempts and deliberate self-harm (34;94)	• Not reported	• Not reported
Treatment • Inpatient-based therapies	• One review found a lack of evidence to determine whether day hospital care is superior to outpatient care in terms of psychiatric symptoms, and found no evidence related to whether day hospital care is better or worse than outpatient treatment for clinical or social outcomes (90)	• None identified by the included review (90)	• There was no evidence that outpatient therapies were better or worse than inpatient therapies in terms of cost (90)
Treatment • Outpatient-based therapies	• Reviews evaluating community-outpatient interventions (such as nurse home visits) or combined inpatient and community-outpatient interventions reported no statistically significant reduction in repetition of suicidal behaviour compared to standard care (being provided with only outpatient appointments) at one-year follow-up (90) • Follow-up contact interventions through postal mail, electronic mail, or in-person visits with discharged patients appear to reduce suicidal behaviour (95) • One systematic review found three trials of interventions for problem drinking (e.g., brief physician intervention with follow-up telephone call) that resulted in reductions in death by suicide (but the reductions were small and not	• One trial found a small increase in suicide after a brief physician intervention (62)	• There was no evidence that outpatient therapies were better or worse than inpatient therapies for costs (90)

	statistically significant), and one study for problem drinking reported a reduction in suicide attempts following telephone aftercare contact (62)		
Treatment • Home-based therapy	• Multi-systemic therapy, or home-based therapy for children and families, was shown to improve some behaviours in children (96) • Intensive home treatment did not lead to greater improvements in children who received this service compared to those who did not (96) • Intensive home-based crisis intervention delivered small improvements to children who received this service (96)	• None identified in the included review (96)	• Costs were not well documented across studies (96)
Treatment • Psychosocial interventions	• There is considerable uncertainty about which forms of psychosocial treatments are most effective (97-102) • While family-based psychosocial interventions in community settings for people living with schizophrenia were not found to prevent or promote suicide, there was some evidence that they may reduce hospitalization and relapse (100) • There is insufficient evidence that psychosocial interventions following an episode of self-harm have an effect on the likelihood of subsequent suicide (97) • There is minimal data suggesting psychosocial interventions for police officers improve physical and psychological symptoms (99) • Adolescents receiving cognitive behavioural therapy were found to report less suicidal ideation as compared to control groups at post-test and follow-up but increases in help-seeking behaviour were not observed (45;103) • One review found similar effects in terms of reduced depression and suicidal behaviour whether intensive or less intensive therapy was delivered to individuals with borderline personality disorder (91) • Interpersonal therapies compared with cognitive therapies for individuals with major depressive disorder did not differ significantly in terms of harms and benefits (101) • One systematic review found a reduction in depressive and anxiety symptoms after participating in group cognitive behavioural therapy, but there were no significant reductions in self-harm (102) • Psychosocial skill-building was found to reduce suicidal risk in adolescents and can be mostly sustained for nine months (95;104) • Parenting programs have been associated with a reduction in self-harm (95;104)	• Group dynamics can have negative effects on participants (102)	• All of the reports that did an economic analysis found family interventions had a net saving in direct and indirect costs (100) • While the review did not do a cost-benefit analysis, reviewed programs appeared to add expense to existing interventions with little benefit (103) • Less and more intensive therapies did not differ in effectiveness, which is important in terms of costs (91)
Treatment • Psychotherapy	• Several systematic reviews have found that dialectic behavioural therapy in borderline personality disorder patients reduces suicides, suicidal ideation, suicidality and parasuicidality in adults,(34;53;60;91;105;105;106;106;107) but there are conflicting findings related to the effects on self-injurious behaviour and suicide attempts (34;108;109) • Psychotherapy is effective at preventing suicide in individuals who deliberately self-harm (110) • Multisystemic therapy is effective at reducing suicidal behaviours in children and adolescents (96) • For individuals screened to be at risk of suicide, psychotherapy significantly reduced the number of suicide	• There was an increase in death by suicide (but not statistically significant) in individuals receiving psychotherapy in some studies (83)	• Not reported

	attempts, but did not reduce suicidal ideation (83) • Psychotherapy has had an inconsistent effect on reducing suicidal ideation and suicidal risk in those without borderline personality disorder,(78;108) however, some studies have shown dramatic reductions on the order of 50% to 75% with maintenance for several months (111)		
Multifaceted • Combined pharmaceutical therapy and psychotherapy	• One review found that there is no added benefit to cognitive behavioural therapy for patients already treated with antidepressants for depressive symptoms, suicidality, or global improvement (111) • A meta-analysis also found no effect on suicidal ideation scores with the addition of pharmacotherapy to psychotherapy, or psychotherapy with placebo, for follow-up as late as 12 months (111)	• Not reported	• Not reported
Multifaceted • Combined screening and psychosocial intervention	• Screening followed by psychosocial intervention has been effective in school populations for reducing suicide risk factors and suicidal ideation (71;79) • Screening followed up by education from a physician reduced death by suicide in men (if follow-up was by a psychiatrist) and women (follow-up by a psychiatrist or family physician) (78) • Screening followed by psychosocial education reduced the risk of death by suicide in older adults (49) • There is conflicting evidence of increased help-seeking in school populations after screening combined with a multimodal intervention (45)	• Not reported	• Not reported
Multifaceted • Other combinations of interventions	• One review found that a U.S. Air Force program delivering training to individuals, coupled with issuing guidelines for practitioners, investing in increased capacity for treatment, and improving surveillance led to a 33% decrease in suicides, and this level of effectiveness was reproduced by Serbia & Montenegro when replicating the program (60) • Other combinations of interventions (e.g. training of individuals coupled with psychosocial counselling and surveillance, or training coupled with crisis intervention cards) had no reliably-measured benefit (60)	• Not reported	• Not reported

Maintenance

We identified three systematic reviews relating to maintenance, including interventions involving ongoing contact (n=2) and compliance management (n=1) (see Table 7). A high-quality review (70) and a medium-quality review (34) found reductions in death by suicide after ongoing-contact interventions (e.g., brief physician intervention with follow-up telephone call). There are mixed results on the harms of these interventions with one trial finding a small but non-statistically significant increase in suicide after a brief physician intervention. Neither review provided information about potential costs of the interventions. An older low-quality review assessed long-term therapy and inpatient-shelter interventions and reported no benefits.(92) None of the identified reviews provided information about potential harms and costs for these interventions. We did not identify reviews that evaluated crisis cards, home-based therapy (as interventions to support compliance with long-term therapy) or about aftercare interventions.

Table 7: Summary of key findings from systematic reviews

Intervention	Key findings		
	Benefits	**Harms**	**Costs**
Compliance with long-term treatment • ongoing contact	• One systematic review found three trials of interventions for problem drinking (e.g., brief physician intervention with follow-up telephone call) that resulted in reductions in death by suicide (but the reductions were small and not statistically significant), and one study for problem drinking that reported a reduction in suicide attempts following telephone aftercare contact (62) • A medium-quality review found that close follow-up contact after discharge from a hospital was effective at reducing death by suicide, and ongoing contact reduced self-harm episodes in more women than men, but did not reduce readmission (34) • Telephone aftercare was found to reduce suicide attempts in one systematic review (62)	• One trial found a small increase in suicide after a brief physician intervention (62)	• None reported
Compliance with long-term treatment • Compliance management • Inpatient shelter	• No benefits reported in the review that was identified (92)	None reported	None reported
Compliance with long-term treatment • Crisis cards • Home-based therapy	• No reviews identified	• No reviews identified	• No reviews identified
Aftercare • Long-term therapy • Service restructuring case management	• No reviews identified	• No reviews identified	• No reviews identified

REFERENCES

1. Health Canada. Suicide in Canada: Update of the Report of the Task Force on Suicide in Canada. Ottawa, Canada: Health Canada; 1994.
2. Skinner R, McFaull S. Suicide among children and adolescents in Canada: trends and sex differences 1980-2008. Canadian Medical Association Journal 2012;184(9):1029-34.
3. Navaneelan T. Suicide Rates: An Overview. Ottawa, Canada: Statistics Canada; 2012.
4. Statistics Canada. Age-standardized mortality rates by selected causes, by sex (both sexes). Statistics Canada 2014 January 28;Available from: URL: http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/health30a-eng.htm
5. Statistics Canada. Suicides and suicide rate, by sex and by age group. Statistics Canada 2014 January 28;Available from: URL: http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/hlth66a-eng.htm
6. Statistics Canada. Deaths and mortality rate, by selected grouped causes, sex and geography - Canada. Statistics Canada 2012;Available from: URL: http://www.statcan.gc.ca/pub/84f0209x/2009000/t001-eng.htm
7. World Health Organization. Suicide prevention (SUPRE). World Health Organization 2012;Available from: URL: http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/
8. Department for Policy Coordination and Sustainable Development.United Nations. Prevention of Suicide: Guidelines for the Formulation and Implementation of National Strategies. New York, United States: United Nations; 2012.
9. World Health Organization. Suicide rates (per 100,000), by gender, Canada, 1950-2004. World Health Organization 2011;Available from: URL: http://www.who.int/mental_health/prevention/suicide/country_reports/en/
10. Rihmer Z. Suicide risk in mood disorders. Current Opinion in Psychiatry 2007;20(1):17-22.
11. Cavanagh JT, Carson AJ, Sharpe M, Lawrie SM. Psychological autopsy studies of suicide: A systematic review. Psychol Med 2003;33(3):395-405.
12. Kirmayer LJ. Changing patterns in suicide among young people. Canadian Medical Association Journal 2012;184(9):1015-6.
13. Canadian Institute for Health Information. Health Indicators, 2011. Ottawa, Canada: Canadian Institute for Health Information; 2011.
14. Rehkopf DH, Buka SL. The association between suicide and the socio-economic characteristics of geographical areas: A systematic review. Psychol Med 2006;36(2):145-57.
15. Oliver L, Peters PA, Kohen DE. Mortality rates among children and teenagers living in Inuit Nunangat, 1994 to 2008. Health Reports 2012;23(3).
16. Health Canada. Suicide Prevention - First Nations and Inuit Health. Health Canada 2012;Available from: URL: http://www.hc-sc.gc.ca/fniah-spnia/promotion/suicide/index-eng.php
17. Advisory Group on Suicide Prevention. Acting on what we know: Preventing youth suicide in First Nations. Report of the Advisory Group on Suicide Prevention 2003;Available from: URL: http://www.hc-sc.gc.ca/fniah-spnia/alt_formats/fnihb-dgspni/pdf/pubs/suicide/prev_youth-jeunes-eng.pdf
18. Kumar MB, Walls M, Janz T, Hutchinson P, Turner T, Graham C. Suicidal ideation among Métis adult men and women - associated risk and protective factors: findings from a nationally representative survey. Int J Circumpolar Health 2012;71:1-11. doi: 10.3402/ijch.v71i0.18829.:1-11.

19. Health Canada. First Nations and Inuit Health Branch In-house Statistics (based on Statistics Canada Data, Mortality Database). Ottawa, Canada: Health Canada; 2000.

20. Kirmayer LJ, Brass GM, Holton T, Paul K, Simpson C, Tait C. Suicide Among Aboriginal People in Canada. Ottawa, Canada: The Aboriginal Healing Foundation; 2007.

21. Marshal MP, Dietz LJ, Friedman MS, Stall R, Smith HA, McGinley J et al. Suicidality and depression disparities between sexual minority and heterosexual youth: A meta-analytic review. J Adolesc Health 2011;49(2):115-23.

22. King M, Semlyen J, Tai SS, Killaspy H, Osborn D, Popelyuk D et al. A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people. BMC Psychiatry 2008;8:70.:70.

23. Liu RT, Mustanski B. Suicidal ideation and self-harm in lesbian, gay, bisexual, and transgender youth. Am J Prev Med 2012;42(3):221-8.

24. Zhao Y, Montoro R, Igartua K, Thombs BD. Suicidal ideation and attempt among adolescents reporting "unsure" sexual identity or heterosexual identity plus same-sex attraction or behavior: Forgotten groups? J Am Acad Child Adolesc Psychiatry 2010;49(2):104-13.

25. Scott A, Guo B. For which strategies of suicide prevention is there evidence of effectiveness? Copenhagen, Denmark: World Health Organization, Regional Office for Europe; 2012.

26. Nunavut Suicide Prevention Strategy. Government of Nunavut, Nunavut Tunngavik Inc , Embrace Life Council, Royal Canadian Mounted Police 2010;Available from: URL: http://inuusiq.com/wp-content/uploads/2012/04/2010-Nunavut-Suicide-Prevention-Strategy-English.pdf

27. Sher L. Preventing suicide. QJM 2004;97(10):677-80.

28. Guo B, Harstall C. For which strategies of suicide prevention is there evidence of effectiveness? Copenhagen, Denmark: World Health Organization, Regional Office for Europe; 2004.

29. Bohanna I, Wang X. Media guidelines for the responsible reporting of suicide: a review of effectiveness. Crisis: Journal of Crisis Intervention & Suicide 2012;33(4):190-8.

30. Sisask M, Värnik A. Media roles in suicide prevention: A systematic review. International Journal of Environmental Research and Public Health 2012;9(1):123-38.

31. Durkee T, Hadlaczky G, Westerlund M, Carli V. Internet pathways in suicidality: A review of the evidence. International Journal of Environmental Research and Public Health 2011;8(10):3938-52.

32. Breton JJ, Boyer R, Bilodeau H, Raymond S, Joubert N, Nantel MA. Is evaluative research on youth suicide programs theory-driven? The Canadian experience. Suicide and Life-Threatening Behavior 2002;32(2):176-90.

33. Gunnell D, Frankel S. Prevention of suicide: Aspirations and evidence. British Medical Journal 1994;308(6938):1227-33.

34. Leitner M, Barr W, Hobby L. Effectiveness of Interventions to Prevent Suicide and Suicidal Behaviour: A Systematic Review. Edinburgh, Scotland: Scottish Government Social Research; 2008.

35. Mann J. Suicide prevention strategies: A systematic review. JAMA: The Journal of the American Medical Association 2005;294(16):2064-74.

36. Sarchiapone M, Mandelli L, Iosue M, Andrisano C, Roy A. Controlling access to suicide means. International Journal of Environmental Research and Public Health 2011;8(12):4550-62.

37. Zamorski MA. Suicide prevention in military organizations. International Review of Psychiatry 2011;23(2):173-80.

38. Pirkis J, Spittal MJ, Cox G, Robinson J, Cheung YT, Studdert D. The effectiveness of structural interventions at suicide hotspots: A meta-analysis. International Journal of Epidemiology 2013;42(2):541-8.

39. Wagenaar AC, Tobler AL, Komro KA. Effects of alcohol tax and price policies on morbidity and mortality: A systematic review. American Journal of Public Health 2010;100(11):2270-8.

40. Guo B, Harstall C, Chatterley P. Means restriction for suicide prevention. Alberta, Canada: Institute of Health Economics; 2010.

41. Feltz-Cornelis CM, Sarchiapone M, Postuvan V, Volker D, Roskar S, Grum AT. Best practice elements of multilevel suicide prevention strategies: A review of systematic reviews. Crisis 2011;32(6):319-33.

42. Simmonds S, Coid J, Joseph P, Marriott S, Tyrer P. Community mental health team management in severe mental illness: A systematic review. British Journal of Psychiatry 2001;178:497-502.

43. Yip PS, Caine E, Yousuf S, Chang SS, Wu KC, Chen YY. Means restriction for suicide prevention. Lancet 2012;379(9834):2393-9.

44. Yip PS, Caine E, Yousuf S, Chang SS, Wu KC, Chen YY. Means restriction for suicide prevention. Lancet 2012;379(9834):2393-9.

45. Klimes-Dougan B, Klingbeil DA, Meller SJ. The impact of universal suicide-prevention programs on the help-seeking attitudes and behaviors of youths. Crisis: Journal of Crisis Intervention & Suicide 2013;34(2):82-97.

46. McCartney G, Thomas S, Thomson H, Scott J, Hamilton V, Hanlon P et al. The health and socioeconomic impacts of major multi-sport events: Systematic review (1978-2008). BMJ 2010;340(7758):c2369.

47. Dieterich M, Irving CB, Marshall M. Intensive case management for severe mental illness. Cochrane Database Syst Rev 2010;(10):Art. No.: CD007906. DOI: 10.1002/14651858.CD007906.

48. Malone D, Newron HG, Simmonds S, Marriot S, Tyrer P. Community mental health teams (CMHTs) for people with severe mental illnesses and disordered personality. Cochrane Database Syst Rev 2007;(3):Art. No.: CD000270. DOI: 10.1002/14651858.CD000270.pub2.

49. Oyama H, Sakashita T, Ono Y, Goto M, Fujita M, Koida J. Effect of community-based intervention using depression screening on elderly suicide risk: A meta-analysis of the evidence from Japan. Community Mental Health Journal 2008;44(5):311-20.

50. Clifford AC, Doran CM, Tsey K. A systematic review of suicide prevention interventions targeting indigenous peoples in Australia, United States, Canada and New Zealand. BMC Public Health 2013;13:463.

51. Mason-Jones AJ, Crisp C, Momberg M, Koech J, Koker P, Mathews C. A systematic review of the role of school-based healthcare in adolescent sexual, reproductive, and mental health. Systematic Reviews 2012;1:49.

52. Katz C, Bolton SL, Katz LY, Isaak C, Tilston-Jones T, Sareen J. A systematic review of school-based suicide prevention programs. Depression and Anxiety 2013;30(10):1030-45.

53. De Silva S., Parker A, Purcell R, Callahan P, Liu P, Hetrick S. Mapping the evidence of prevention and intervention studies for suicidal and self-harming behaviors in young people. Crisis: Journal of Crisis Intervention & Suicide 2013;34(4):223-32.

54. Kutcher S, Wei Y. Mental health and the school environment: Secondary schools, promotion and pathways to care. Current Opinion in Psychiatry 2012;25(4):311-6.

55. Guo B, Harstall C. Efficacy of Suicide Prevention Programs for Children and Youth. Edmonton, Canada: Alberta Heritage Foundation for Medical Research; 2002.

56. Pena JB, Caine ED. Screening as an approach for adolescent suicide prevention. Suicide and Life-Threatening Behavior 2006;36(6):614-37.

57. Ploeg J, Ciliska D, Brunton G, MacDonnell J, O'Brien MA. The Effectiveness of School-Based Curriculum Suicide Prevention Programs for Adolescents. Toronto, Canada: Public Health Branch, Ontario Ministry of Health; 1999.

58. Schachter HM, Girardi A, Ly M, Lacroix D, Lumb AB, van BJ et al. Effects of school-based interventions on mental health stigmatization: a systematic review. Child and Adolescent Psychiatry and Mental Health 2008;2(1):18.

59. Ploeg J, Ciliska D, Dobbins M, Hayward S, Thomas H, Underwood J. A systematic overview of adolescent suicide prevention programs. Canadian Journal of Public Health 1996;87(5):319-24.

60. Bagley SC, Munjas B, Shekelle P. A systematic review of suicide prevention programs for military or veterans. Suicide & Life-Threatening Behavior 2010 June 1;40(3):257-65.

61. O'Neil ME, Peterson K, Low A, Carson S, Denneson S, Haney E et al. Suicide prevention interventions and referral/follow-up services: A systematic review. VA-ESP Project #05-225 ed. Portland, OR: Department of Veterans Affairs; 2012.

62. Dinh-Zarr T, Goss C, Heitman E, Roberts I, DiGuiseppi C. Interventions for preventing injuries in problem drinkers. Cochrane Database of Systematic Reviews 2004;(3):Art. No.: CD001857. DOI: 10.1002/14651858.CD001857.pub2.

63. Stewart-Brown S. What is the evidence on school health promotion in improving health or preventing disease and, specifically, what is the effectiveness of the health promoting in schools approach? Copenhagen, Denmark: WHO Regional Office for Europe; 2006.

64. Daine K, Hawton K, Singaravelu V, Stewart A, Simkin S, Montgomery P. The power of the web: A systematic review of studies of the influence of the internet on self-harm and suicide in young people. PLoS ONE 2013;8(10).

65. Dumesnil H, Verger P. Public awareness campaigns about depression and suicide: A review. Psychiatric Services 2009;60(9):1203-13.

66. Pagura J, Fotti S, Katz LY, Sareen J. Help seeking and perceived need for mental health care among individuals in Canada with suicidal behaviors. Psychiatr Serv 2009;60(7):943-9.

67. Robinson J, Cox G, Malone A, Williamson M, Baldwin G, Fletcher K et al. A systematic review of school-based interventions aimed at preventing, treating, and responding to suicide- related behavior in young people. Crisis: Journal of Crisis Intervention & Suicide 2013;34(3):164-82.

68. Wells J, Barlow J, Steward-Brown S. A systematic review of universal approaches to mental health promotion in schools. Health Education 2003;103(4):197-220.

69. Balaguru V, Sharma J, Waheed W. Understanding the effectiveness of school-based interventions to prevent suicide: A realist review. Child and Adolescent Mental Health 2013;18(3):131-9.

70. Kidger J, Araya R, Donovan J, Gunnell D. The effect of the school environment on the emotional health of adolescents: A systematic review. Pediatrics 2012;129(5):925-49.

71. Pompili M, Innamorati M, Girardi P, Tatarelli R, Lester D. Evidence-based interventions for preventing suicide in youths. Cambridge, MA, USA: Hogrefe Publishing; 2011.

72. Burrus B, Leeks KD, Sipe TA, Dolina S, Soler R, Elder R et al. Person-to-person interventions targeted to parents and other caregivers to improve adolescent health: A community guide systematic review. American Journal of Preventive Medicine 2012;42(3):316-26.

73. Hider P. Youth Suicide Prevention by Primary Healthcare Professionals: A Critical Appraisal of the Literature. Christchurch, New Zealand: New Zealand Health Technology Assessment; 1998.

74. Szumilas M, Kutcher S. Systematic Review of Suicide Postvention Programs. Halifax, Canada: Nova Scotia Department of Health Promotion and Protection; 2010.

75. Szumilas M, Kutcher S. Post-suicide intervention programs: A systematic review. Canadian Journal of Public Health 2011;102(1):18-29.

76. Chen YY, Wu KC, Yousuf S, Yip PS. Suicide in Asia: Opportunities and challenges. Epidemiologic Reviews 2012;34(1):129-44.

77. Isaac M, Elias B, Katz LY, Belik SL, Deane FP, Enns MW et al. Gatekeeper training as a preventative intervention for suicide: A systematic review. Canadian Journal of Psychiatry 2009;54(4):260-8.

78. Wyar M, Abbar M, Courtet P. Preventing late life suicide: A review. Minerva Psichiatrica 2012;53(2):123-31.

79. Pompili M, Innamorati M, Vichi M, Masocco M, Vanacore N, Lester D et al. Suicide prevention among youths: Systematic review of available evidence-based interventions and implications for Italy. Minerva Pediatrica 2010;62(5):507-35.

80. Hailey D, Roine R, Ohinmaa A. The effectiveness of telemental health applications: A review. Canadian Journal of Psychiatry 2008;53(11):769-78.

81. Williams SB, O'Connor EA, Eder M, Whitlock EP. Screening for child and adolescent depression in primary care settings: A systematic evidence review for the US Preventive Services Task Force. Pediatrics 2009;123(4):e716-e735.

82. Lapierre S, Erlangsen A, Waern M, De LD, Oyama H, Scocco P et al. A systematic review of elderly suicide prevention programs. Crisis 2011;32(2):88-98.

83. O'Connor E, Gaynes BN, Burda BU, Soh C, Whitlock EP. Screening for and treatment of suicide risk relevant to primary care: A systematic review for the U.S. Preventive Services Task Force. Annals of Internal Medicine 2013;158(10):741-54.

84. Baldessarini RJ, Tondo L, Hennen J. Lithium treatment and suicide risk in major affective disorders: Update and new findings. Journal of Clinical Psychiatry 2003;64(Suppl 5):44-52.

85. Tondo L, Hennen J, Baldessarini RJ. Lower suicide risk with long-term lithium treatment in major affective illness: A meta-analysis. Acta Psychiatrica Scandinavica 2001;104(3):163-72.

86. Cipriani A, Hawton K, Stockton S, Geddes JR. Lithium in the prevention of suicide in mood disorders: Updated systematic review and meta-analysis. BMJ 2013;346:f3646.

87. Hawton K, Arensman E, Townsend E, Bremner S, Feldman E, Goldney R et al. Deliberate self harm: Systematic review of efficacy of psychosocial and pharmacological treatments in preventing repetition. British Medical Journal 1998;317(7156):441-7.

88. Pfennig A, Bschor T, Falkai P, Bauer M. The diagnosis and treatment of bipolar disorder: Recommendations from the current s3 guideline. Deutsches Arzteblatt International 2013;110(6):92-100.

89. Newton AS, Hamm MP, Bethell J, Rhodes AE, Bryan CJ, Tjosvold L et al. Pediatric suicide-related presentations: A systematic review of mental health care in the emergency department. Annals of Emergency Medicine 2010;56(6):649-59.

90. Hall K. What is the effectiveness of day care versus outpatient care versus community care for suicidal patients? Evidence tables. 2002.

91. Davidson KM, Tran CF. Impact of treatment intensity on suicidal behavior and depression in borderline personality disorder: A critical review. Journal of Personality Disorders 2013;27(3):1-17.

92. van der Sande R, Buskens E, Allart E, van der Graaf Y, van EH. Psychosocial intervention following suicide attempt: A systematic review of treatment interventions. Acta Psychiatrica Scandinavica 1997;96(1):43-50.

93. Wethington HR, Hahn RA, Fuqua-Whitley DS, Sipe TA, Crosby AE, Johnson RL et al. The effectiveness of interventions to reduce psychological harm from traumatic events among children and adolescents: A systematic review. American Journal of Preventive Medicine 2008;35(3):287-313.

94. Robinson J, Hetrick SE, Martin C. Preventing suicide in young people: Systematic review. The Australian and New Zealand Journal of Psychiatry 2011;45(1):3-26.

95. Luxton DD, June JD, Comtois KA. Can postdischarge follow-up contacts prevent suicide and suicidal behavior? A review of the evidence. Crisis: Journal of Crisis Intervention & Suicide 2013;34(1):32-41.

96. Shepperd S, Doll H, Gowers S, James A, Fazel M, Fitzpatrick R et al. Alternatives to inpatient mental health care for children and young people. Cochrane Database Syst Rev 2009;(2):CD006410.

97. Crawford MJ, Thomas O, Khan N, Kulinskaya E. Psychosocial interventions following self-harm: Systematic review of their efficacy in preventing suicide. British Journal of Psychiatry 2007;190:11-7.

98. Hawton K, Townsend E, Arensman E, Gunnell D, Hazell P, House A et al. Psychosocial versus pharmacological treatments for deliberate self harm. Cochrane Database Syst Rev 2000;(2):CD001764.

99. Penalba V, McGuire H, Leite JR. Psychosocial interventions for prevention of psychological disorders in law enforcement officers. Cochrane Database Syst Rev 2008;(3):CD005601.

100. Pharoah F, Mari J, Rathbone J, Wong W. Family intervention for schizophrenia. Cochrane Database Syst Rev 2010;(12):Art. No.: CD000088. DOI: 10.1002/14651858.CD000088.pub3.

101. Jakobsen JC, Hansen JL, Simonsen S, Simonsen E, Gluud C. Effects of cognitive therapy versus interpersonal psychotherapy in patients with major depressive disorder: A systematic review of randomized clinical trials with meta-analyses and trial sequential analyses. Psychological Medicine 2012;42(7):1343-57.

102. Townsend E, Walker DM, Sargeant S, Vostanis P, Hawton K, Stocker O et al. Systematic review and meta-analysis of interventions relevant for young offenders with mood disorders, anxiety disorders, or self-harm. Journal of Adolescence 2010;33(1):9-20.

103. Corcoran J, Dattalo P, Crowley M, Brown E, Grindle L. A systematic review of psychosocial interventions for suicidal adolescents. Children and Youth Services Review 2011;33(11):2112-8.

104. McNamara RK. Long-chain omega-3 fatty acid deficiency in mood disorders: Rationale for treatment and prevention. Current Drug Discovery Technologies 2013;10(3):233-44.

105. Mujoomdar M, Cimon K, Nkansah E. Dialectical behaviour therapy in adolescents for suicide prevention: Systematic review of clinical-effectiveness. Ottawa: Canadian Agency for Drugs and Technologies in Health (CADTH); 2009.

106. Stoffers JM, Völlm BA, ücker G, immer A, uband N, ieb K. Psychological therapies for people with borderline personality disorder. Cochrane Database of Systematic Reviews 2012;(8):Art. No.: CD005652. DOI: 10.1002/14651858.CD005652.pub2.

107. Goldzweig CL, Balekian TM, Rolón C, Yano EM, Shekelle PG. The state of women veterans' health research. Results of a systematic literature review. Journal of General Internal Medicine 2006;21(Suppl 3):S82-S92.

108. Hepp U, Wittmann L, Schnyder U, Michel K. Psychological and psychosocial interventions after attempted suicide: An overview of treatment studies. Crisis 2004;25(3):108-17.

109. Richardson TH. Psychosocial interventions for bipolar disorder: A review of recent research. Journal of Medical Sciences 2010;10(6):143-52.

110. Winter D, Bradshaw S, Bunn F, Wellsted D. Counselling and psychotherapy for the prevention of suicide: A systematic review of the evidence. Lutterworth: British Asociation of Counselling and Psychotherapy; 2009.

111. Cox GR, Callahan P, Churchill R, Hunot V, Merry SN, Parker AG et al. Psychological therapies versus antidepressant medication, alone and in combination for depression in children and adolescents. Cochrane Database of Systematic Reviews 2012;(11):Art. No.: CD008324. DOI: 10.1002/14651858.CD008324.pub2.

112. Reilly S, Planner C, Gask L, Hann M, Knowles S, Druss B et al. Collaborative care approaches for people with severe mental illness. Cochrane Database of Systematic Reviews 2013;(11):CD009531.

113. Cusimano MD, Sameem M. The effectiveness of middle and high school-based suicide prevention programmes for adolescents: A systematic review. Injury Prevention 2011;17(1):43-9.

114. York JA, Lamis DA, Pope CA, Egede LE. Veteran-specific suicide prevention. Psychiatric Quarterly 2013;84(2):219-38.

115. Talseth AG, Gilje FL. Nurses' responses to suicide and suicidal patients: A critical interpretive synthesis. Journal of Clinical Nursing 2011;20(11-12):1651-67.

116. Comtois KA. A review of interventions to reduce the prevalence of parasuicide. Psychiatric Services 2002;53(9):1138-44.

117. Donker T, Petrie K, Proudfoot J, Clarke J, Birch MR, Christensen H. Smartphones for smarter delivery of mental health programs: A systematic review. Journal of Medical Internet Research 2013;15(11):e247.

118. Daigle MS, Pouliot L, Chagnon F, Greenfield B, Mishara B. Suicide attempts: Prevention of repetition. Canadian Journal of Psychiatry 2011;56(10):621-9.

119. Wittouck C, Van Autreve S, De Jaegere E, Portzky G, van Heeringen K. The prevention and treatment of complicated grief: A meta-analysis. Clinical Psychology Review 2011;31(1):69-78.

120. Dyregrov K. What do we know about needs for help after suicide in different parts of the world? A phenomenological perspective. Crisis 2011;32(6):310-8.

121. McMillan D, Gilbody S, Beresford E, Neilly L. Can we predict suicide and non-fatal self-harm with the Beck Hopelessness Scale? A meta-analysis. Psychological Medicine 2007;37:769-78.

122. Perry AE, Marandos R, Coulton S, Johnson M. Screening tools assessing risk of suicide and self-harm in adult offenders: A systematic review. International Journal of Offender Therapy and Comparative Criminology 2010;54(5):803-28.

123. Tarrier N, Taylor K, Gooding P. Cognitive-behavioral interventions to reduce suicide behavior: A systematic review and meta-analysis. Behavior Modification 2008;32(1):77-108.

124. Dubicka B, Elvins R, Roberts C, Chick G, Wilkinson P, Goodyer IM. Combined treatment with cognitive-behavioural therapy in adolescent depression: Meta-analysis. The British Journal of Psychiatry 2010;197(6):433-40.

125. Cuijpers P, de Beurs DP, van Spijker BA, Berking M, Andersson G, Kerkhof AJ. The effects of psychotherapy for adult depression on suicidality and hopelessness: A systematic review and meta-analysis. Journal of Affective Disorders 2012;144(3):183-90.

126. Daniel SS, Goldston DB. Interventions for suicidal youth: A review of the literature and developmental considerations. Suicide and Life-Threatening Behavior 2009;39(3):252-68.

127. Huisman A, Pirkis J, Robinson J. Intervention studies in suicide prevention research. Crisis: The Journal of Crisis Intervention and Suicide Prevention 2010;31(5):281-4.

APPENDICES

The following tables provide detailed information about the systematic reviews identified in the rapid synthesis. The ensuing information was extracted from each systematic review: intervention, focus of the review, key findings, last year the literature was searched, the proportion of studies conducted in Canada and the proportion of studies focused on people with mental health and addictions.

The fifth column presents a rating of the overall quality of each review. The quality of each review has been assessed using AMSTAR (A MeaSurement Tool to Assess Reviews), which rates overall quality on a scale of 0 to 11, where 11/11 represents a review of the highest quality. It is important to note that the AMSTAR tool was developed to assess reviews focused on clinical interventions, so not all criteria apply to systematic reviews pertaining to delivery, financial, or governance arrangements within health systems. Where the denominator is not 11, an aspect of the tool was considered not relevant by the raters. In comparing ratings, it is therefore important to keep both parts of the score (i.e., the numerator and denominator) in mind. For example, a review that scores 8/8 is generally of comparable quality to a review scoring 11/11; both ratings are considered "high scores." A high score signals that readers of the review can have a high level of confidence in its findings. A low score, on the other hand, does not mean that the review should be discarded, merely that less confidence can be placed in its findings and that the review needs to be examined closely to identify its limitations. (Lewin S, Oxman AD, Lavis JN, Fretheim A. SUPPORT Tools for evidence-informed health Policymaking (STP): 8. Deciding how much confidence to place in a systematic review. *Health Research Policy and Systems* 2009; 7 (Suppl1):S8).

All of the information provided in the appendix table was taken into account by the authors in describing the findings in the rapid synthesis.

Appendix 1 – Systematic reviews evaluating universal, selective and indicated prevention interventions

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
Prevention							
Universal • Media-reporting restrictions	Review of the evidence on the internet and suicidality, and the different pathways by which suicidal risks and prevention efforts are facilitated through the internet (31)	Specific internet pathways increased risk for suicidal behaviours, particularly in adolescents and young people. Several studies found significant correlations between pathological internet use and suicidal ideation and non-suicidal self-injury. Pro-suicide websites and online suicide pacts were observed as high-risk factors for facilitating suicidal behaviours, particularly among isolated and susceptible individuals. Paradoxically, the internet can also be an effective tool for suicide prevention, especially for socially-isolated and vulnerable individuals who might otherwise be unreachable.	Not reported	1/9 (AMSTAR rating from the McMaster Health Forum)	Not reported	Not reported	Not reported
	Review of the research performed on the roles of media in suicide prevention, in order to determine the effects of media reporting on suicidal behaviours on actual suicidality (suicides, attempted suicides, or suicidal ideation) (30)	Most studies support the idea that media reporting and suicidality are associated, although there is a risk of reporting bias. In general, there was more research available on the ways in which irresponsible media reporting can provoke suicidal behaviours (the "Werther effect") and there was less research on the protective effective of the media (the "Papageno effect"). Strong modelling effect of media coverage on suicide is based on age and gender.	Not reported	4/10(AMSTAR rating from the McMaster Health Forum)	1/56	0/56	56/56
	Review of evidence for the use and effectiveness of media reporting guidelines for suicide reporting (29)	Studies show a sharp reduction in suicides after introduction of suicide reporting guidelines. In one study, there was a decrease in suicides by 75% and the rate remained low for the following five years.	Not reported	3/10 (AMSTAR rating from McMaster Health Forum)	0/11	0/11	11/11

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Subpopulation analyses showed that effects were restricted to areas where there is high penetration of compliant media with no effect elsewhere. Analysis of reporting shows a decrease in the use of "suicide" and "self-murder" in headlines, glorifying or sensationalizing text or headlines, inclusion of pictures, details of suicidal acts, graphics, and reference to celebrity status. Some studies show a paradoxical increase in stories about suicide despite the aforementioned changes. One study showed a regression of reporting over time towards the original values. Reporters were generally unaware of guidelines and not supportive of them; however, when organizational training takes place, the use of guidelines is higher. The authors recommend utilizing "media endorsement, active dissemination strategies, and ongoing training and monitoring" in order to reduce suicide.					
Universal • Means-access restrictions	Effectiveness of specific suicide-preventive interventions related to: awareness and education, screening, treatment interventions, lethal means restriction, and media (35)	The evidence indicated that both education of physicians in depression recognition and treatment, and restricting access to lethal means reduced suicide rates. Gatekeeper education also showed promise for decreasing suicide rates. Other methods, such as public education, screening programs and media education, require more evidence of efficacy. Many universal or targeted educational interventions are multifaceted, so more research may be required to determine which components produce the desired outcomes.	2005	4/10(AMSTAR rating from the McMaster Health Forum)	3/93	20/93	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	Review of suicide programs that have been evaluated for Canadian youth aged 10 to 24, and the ways in which new trends in the field of program evaluation may help guide efforts in suicide-program evaluation (32)	Six of the nine school programs that were identified led to improvements in knowledge about suicide, while one led to improvements in attitudes about suicide, and three led to improvements in skills required to intervene in the suicidal process. None of the programs showed an effect on suicidal ideation or suicide attempts. One of the three suicide-prevention centre programs led to a reduction in suicidal urgency, while another of the three led to reduction in suicidal ideation. One study evaluating the effects of gun control on overall suicide rates found inconclusive results.	1996	4/9(AMSTAR rating from the McMaster Health Forum)	15/15	12/15	15/15
	To examine the evidence on available interventions and points of access (in the primary healthcare, secondary healthcare and public health domains) for those at risk of suicide (33)	While no single intervention has been found to reduce suicide, the greatest potential seems to arise from limiting the availability of methods for committing suicide (e.g. the introduction of the catalytic converter to reduce lethality of car exhausts and thus suicide using this method). General practitioner education programs, the effectiveness of lithium and maintenance antidepressants, and limits on the quantity of medicines available over the counter or on prescription should all be evaluated. The review offers little support for the aspiration that the posited targets can be achieved on the basis of current knowledge and current policy.	Not reported	3/9(AMSTAR rating from the McMaster Health Forum)	Not reported	Not reported	Not reported (although the focus of the study is on suicide)
	Effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal ideation, both in key risk groups and in the general population (34)	The most prominent focus of the literature to date has been on pharmaceutical interventions, but the results of these studies provide few indicators of a consistent positive impact. There is evidence from a number of studies that the	2006	9/10 (AMSTAR rating from the McMaster Health Forum)	7/235	Not yet available	235/235

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		use of lithium in bipolar disorder may reduce attempted and completed suicide. Little evidence was identified regarding effective pharmaceutical intervention for self-harm. Some high-quality studies indicate the treatment of depression with fluvoxamine and sertraline may reduce suicidal ideation. Restrictions in access to lethal means, and service provision via specialist centres with highly trained personnel, can reduce rates of suicide. The use of individualized and intensive cognitive and behavioural therapies has shown promise in reducing attempted suicide and self-harm, with the most promising methods being cognitive behavioural therapy (CBT) and dialectical behavioural therapy (DBT). There is little evidence on the effectiveness of other non-pharmaceutical interventions for suicidal ideation.					
	Effectiveness of controlling the access to means of suicide (such as firearms, toxic gas and pesticides) (36)	In many countries, restrictions on access to common means of suicide has led to reduced overall suicide rates. Declines in prescriptions of barbiturates and tricyclic antidepressants (TCAs), and limitation of drugs pack size for paracetamol and salicylate, has reduced suicides by overdose. Increased prescriptions of selective serotonin reuptake inhibitors (SSRIs) appears to have lowered suicide rates. Restriction to means of suicide may be effective where the method is popular, highly lethal, widely available, and/or not easily substituted by other similar methods.	Not reported	0/9 (AMSTAR rating from the McMaster Health Forum)	Not reported	Not reported	Not reported (although the focus of the review is on suicide)

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	Suicide risk in military organizations (in order to determine if military personnel are at increased risk for suicide), and the effects of preventive interventions in different civilian settings (37)	On average, suicide rates in currently serving military personnel are less than rates observed in the general population (for the same age and sex distribution). It is highly probable that the same broad range of risk factors, protective factors and triggers for suicidal behaviour identified in the general population also applies to military populations. Special opportunities for suicide prevention in military organizations include: education and awareness campaigns; screening and assessment; restriction of access to lethal means; media engagement; organizational interventions to mitigate work stress or strain; interventions to overcome barriers to care; and risk factors modification, among others.	Not reported	1/9 (AMSTAR rating from the McMaster Health Forum)	Not reported	Not reported	Not reported
	Effectiveness of structural interventions (e.g., barriers, safety nets) to prevent jumping suicide at suicide 'hotspots' and at other nearby jumping sites (38)	There is strong evidence that structural interventions reduce death by suicide at suicide 'hotspots' as there is an overall net reduction of deaths. The suicide rate from jumping after construction of structural interventions decreased from 5.7 deaths per year to 0.5 deaths per year. Adjusting for inter-study variability, the percentage of jumping suicides was reduced 86%. Although a 44% increase in suicide was concurrently observed at nearby sites, the overall net effect was a 28% reduction of suicide deaths from jumping.	2012	1/11 (AMSTAR rating from McMaster Health Forum)	1/9	0/9	9/9
	Review of: 1) national means-restrictions policies, and 2) evidence of effectiveness for national/provincial intentional overdose prevention policies (40)	A majority of suicides worldwide as well as in Canada are by hanging, suffocation or strangulation. Poisoning and firearms are other common means, with poisoning being the most common means among women. Current national strategies do not address hanging, suffocation or strangulation Suicides have decreased after restricting the prescription and sale of barbiturates and alcohol, and	2009	4/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	3/3

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		changing analgesic packaging to blister packs. Acetominophen restrictions have coincided with a reduction in acetaminophen-related deaths and hospitalizations to specialized liver units, though some evidence implies the relationship may not be causal. Data on acetaminophen sales and severity of overdoses is equivocal. One study found that restrictions on acetaminophen reduced its use, but led to an increase in use of other drugs. Restriction of co-promaxol in the U.K. was associated with a reduction in its prescription as well as a significant reduction in co-promaxol deaths. Restriction of barbiturates led to a decrease in suicide deaths, by substituting barbiturates with use of antidepressants. A U.S. study indicates that restriction of alcohol results in a decrease of suicides in young males, but not females. Parental education after a suicide attempt by a child was associated with action taken by parents to restrict means. The authors noted that there are inconsistencies on the results of drug restriction legislations which may be due to differences in methodology of studies.					
	Means restriction for suicide prevention (43)	Means restriction is more effective in women than men, as men seem more likely to substitute with alternate means. There have been more substitutions in areas of Asia where means restriction has been utilized more than in other parts of the world.	2012	1/10 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Restriction works best with common and lethal means that are accountable for many deaths, and in concert with other initiatives.					
	Effectiveness of alcohol tax and price regulations on reducing alcohol-related morbidity and mortality (39)	Four studies on suicide computed a total of 12 effect measures by dividing populations into age cohorts in two studies. Five of 12 articles showed a statistically significant reduction in suicides with intervention. Across 11 independent measures of effect, the meta-estimate was marginally significant, becoming strongly significant with the exclusion of an outlier.	2009	5/11 (AMSTAR rating from McMaster Health Forum)	4/50	Not Reported	4/50
	Review of systematic reviews of effectiveness of multilevel suicide prevention interventions, and identification of interventions that may have synergistic potential (41)	The effective interventions identified included: pharmacotherapy and cognitive behavioural therapy for depression at a primary care level; gatekeeper training (population level); screening of high-risk groups (population level); means restriction (population level); hospitalization (targeted to psychiatric patients); telephone and emotional support targeting psychiatric patients; palliative care and rural community-based support for older adults; and ethnically-tailored community-wide public health programs (including video-focused educational interventions targeting ethnic minorities to modify family expectations of self-harm, and school-based initiatives to train staff and students how to respond to suicide). The review noted that gatekeeper training has generally been studied as part of a more comprehensive intervention, and so the specific impact of gatekeeper training is less clear. There is equivocal evidence on the effectiveness of public awareness at the population level , school-based intervention programs targeting children and adolescents, as well as psychotherapeutic, pharmaceutical, behavioural, and staff and parent training initiatives targeting children and adolescents .	2011	7/11 (AMSTAR rating from McMaster Health Forum)	Not reported	1/6	5/6

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		No explicit synergistic results were presented.					
Universal • National suicide-prevention programs	No reviews identified						
Universal • Public messaging	Review of evidence of suicide-prevention programming on help-seeking attitudes and behaviours in youths (45)	Psychoeducational programs generally do not increase help-seeking behaviour. However, combining multimodal interventions with another intervention such as screening has had an effect on help-seeking in some studies, but not in others. Combining pscyhoeducation with peer-help training did not exhibit an effect. Gatekeeper training in two studies did not show improvements in attitudes or in help-seeking behaviour among school students. In one study, a decrease in help-seeking from parents and peers occurred. One other study found that gatekeeper training improved securing resources for students in need. Public service messaging has had mixed results. One simulation study found no effect on help-seeking attitudes. Another study found no change in knowledge of sources of help, but did reduce perceived barriers to help-seeking and resulted in an increase in those who sought help, though not specifically for a mental health problem.	Not Reported	1/10 (AMSTAR rating from McMaster Health Forum)	Not Reported	0/19	19/19
Universal • Other	Effectiveness of hosting a major multi-sport event on a host city population's health and determinants of health (46)	After adjusting for potential confounders, the one study looking at suicide as an outcome found no change in suicide rates from hosting the Olympic Games.	2008	10/11 (AMSTAR rating from McMaster Health Forum)	5/54	0/54	1/54
Selective • Suicide-prevention centres	Review of suicide programs that have been evaluated for Canadian youth aged 10 to 24, and the ways in which new trends in the field	Six of the nine school programs that were identified led to improvements in knowledge about suicide, while one led to improvements in attitudes about suicide, and three led to improvements in skills	1996	4/9(AMSTAR rating from the McMaster Health Forum)	15/15	12/15	15/15

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	of program evaluation may help guide efforts in suicide-program evaluation (32)	required to intervene in the suicidal process. None of the programs showed an effect on suicidal ideation or suicide attempts. One of the three suicide-prevention centre programs led to a reduction in suicidal urgency, while another of the three led to reduction in suicidal ideation. One study evaluating the effects of gun control on overall suicide rates found inconclusive results.					
Selective • Community-based suicide-prevention programs	Review of the effectiveness of Intensive Case Management (ICM), for people with severe mental illnesses (47)	ICM, compared to standard care, was shown to reduce hospitalization, increase retention in care and improve social functioning. However, its effects on mental state and quality of life are unclear. There is a suggestion that ICM reduced the risk of death and suicide. In comparing ICM to non-ICM, differences between ICM and the less formal non-ICM approach are not clear, although ICM may lead to comparatively greater retention in care. Further reviews comparing non-ICM with standard care should be undertaken. Valid overall conclusions were difficult to make as the healthcare and social support systems of the study countries were quite different.	2009	7/11 (AMSTAR rating from Program in Policy Decision-making)	1/38	38/38	16/38
	Effectiveness of community-based depression screening (CDS) with follow-up on the completed suicide risk for older adults aged 65 and over (49)	The implementation of universal prevention programs involving CDS and health education is associated with reduced risk of death by suicide among older adults. However, there were very few studies included in the review to demonstrate an association between CDS and reduced risk, suggesting gender difference in the effectiveness of the intervention.	2007	4/11 (AMSTAR rating from Program in Policy Decision-making)	0/5	0/5	5/5
	Effectiveness of Community Mental Health Team (CMHT)	CMHT consisted of a multidisciplinary, community-based team, while standard care consisted of non-team	2006	11/11 (AMSTAR	Not reported	3/3	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	treatment for people with serious mental illness, compared to standard non-team management (48)	community care, outpatient care, and admission to hospital or day hospital. CMHT is not inferior to non-team standard care in any important respects, but is superior in promoting greater acceptance of treatment. CMHT may also be superior in reducing hospital admission and deaths by suicide. Evidence to support CMHTs over hospital-based management is limited.		rating from McMaster Health Forum)			
	Effectiveness of community mental health team (CMHT) management in severe mental illness, compared to standard approaches (42)	CMHT is defined as a community-based multidisciplinary team that provides a full range of interventions to adults aged 18 to 65 with severe mental illness, while standard care is defined as usual care not provided by a community team (which in most circumstances is hospital-based outpatient care. CMHT is a cost-effective method of delivering care to people with severe mental illnesses. It is superior to standard care in promoting greater acceptance of treatment, and may reduce both hospital admission as well as deaths by suicide.	1997	4/10 (AMSTAR rating from Program in Policy Decision-making)	1/5	5/5	5/5
	Effectiveness of education campaigns targeted at the general public to improve awareness of suicidal crises and depression (65)	Public awareness campaigns were divided into four main categories: short media campaigns, gatekeeper training, long national programs, and long local or community programs. The evidence suggests that public awareness programs contributed to a modest improvement in public knowledge of and attitudes towards depression or suicide, although most program evaluations did not assess the durability of the attitude changes. No study clearly showed that the awareness campaigns helped to increase care-seeking or decrease suicidal behaviour.	2007	3/9(AMSTAR rating from the McMaster Health Forum)	2/15	15/15	6/15
	Collaborative care approaches for severe mental illness (schizophrenia, schizophrenia-like illness, bipolar affective disorder,	In the single included study, there was no statistically significant difference in suicide deaths between the intervention and control groups.	2011	10/10 (AMSTAR rating from Program in	0/1	1/1	0/1

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	or other psychosis) for people living in the community (112)			Policy Decision-making)			
	Review of systematic reviews of effectiveness of multilevel suicide-prevention interventions, and identification of interventions that may have synergistic potential (41)	The effective interventions identified included: pharmacotherapy and cognitive behavioural therapy for depression at a primary care level; gatekeeper training (population level); screening of high risk groups (population level); means restriction (population level); hospitalization (targeted to psychiatric patients); telephone and emotional support targeting psychiatric patients; palliative care and rural community-based support for older adults; and ethnically-tailored community-wide public health programs (including video-focused educational interventions targeting ethnic minorities to modify family expectations of self-harm, and school-based initiatives to train staff and students how to respond to suicide). The review noted that gatekeeper training has generally been studied as part of a more comprehensive intervention, and so the specific impact of gatekeeper training is less clear. There is equivocal evidence on the effectiveness of public awareness at the population level , school-based intervention programs targeting children and adolescents, as well as psychotherapeutic, pharmaceutical, behavioural, and staff and parent training initiatives targeting children and adolescents . No explicit synergistic results were presented.	2011	7/11 (AMSTAR rating from McMaster Health Forum)	Not reported	1/6	5/6
	Influence of the internet on the risk of self-harm or suicide in young people aged below 25 years (64)	Evidence of reported positive influences from internet forums were found in seven studies and included reinforcement of positive behaviour, praising and supporting efforts not to self-harm, and encouraging individuals to see healthcare providers for assistance. There are mixed results regarding whether forums		5/11 (AMSTAR rating from McMaster Health Forum)	0/16	0/16	16/16

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		truly correlate with a reduction in self-harm. Two studies also indicated potential positive influences to other internet media with one suggesting youth reporting self-harm use on the internet to connect with others and reduce psychological distress, and another study finding that some view interactive media as a source of support. Five studies indicated negative influences such as normalization of self-harm, reduced disclosure, and worsening distress deriving from internet forums use. Another study found that this was statistically significant, but not for social networking sites. Seven other studies looking at other internet uses found additional negative effects of internet use. General internet use was reported to be a source to be exposed to and to learn about suicide and self-harm. Several studies showed correlation with greater internet use or addiction to the internet with increased incidence of self-harm and suicidal ideation. Two quantitative studies suggested that cyber-bullying may have a significant influence on self-harm and may increase rates of attempted suicide.					
	Suicide and suicidal-behaviour-prevention interventions in indigenous populations in Canada, the United States, Australia, and New Zealand (50)	The main interventions identified were community-prevention initiatives (alcohol restriction, empowerment-building, and multi-strategy), gatekeeper training, and educational programs. Two community-prevention interventions significantly reduced the rates of suicide or suicidal behaviour, and a third led to statistically significant increases in protective behaviours. A fourth community study reported subjective improvements in protective factors. Gatekeeper training yielded statistically significant increases in knowledge and confidence in how to	2012	7/10 (AMSTAR rating from Program in Policy Decision-making)	1/9	0/9	9/9

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		identify those at risk of suicide, and in intentions to help those at risk. Culturally-tailored educational programs showed statistically significant reductions in feelings of hopelessness, as well as less suicidality, though not to the statistically significant threshold. A one-off multimedia educational intervention also significantly improved knowledge of risk behaviours at post-test.					
Selective • School-based suicide-prevention programs	Effectiveness and harms of school-based interventions, directed at students 18 years of age or younger, to prevent or eliminate stigmatization on the basis of mental health (58)	Interventions identified include education-only (e.g. activities, events and materials), contact-only (e.g. participants having direct contact with a mental health professional or someone experiencing mental health difficulties), and education-and-contact interventions (containing at least one component of each type. Limitations within the evidence base prevents drawing conclusions about the value of school-based interventions to prevent or eliminate mental health stigmatization. However, suggestive evidence within and beyond the evidence base promotes development of a curriculum that fosters development of empathy and orientation towards social inclusion and inclusiveness.	2007	4/9(AMSTAR rating from the McMaster Health Forum)	8/40	40/40	1/40
	Effectiveness of school-based curriculum suicide-prevention programs for adolescents (57)	Interventions include suicide education and training in general coping skills. Interventions were provided by schoolteachers, school counsellors or social workers, mental health specialists, or school nurses. The review suggests there is currently insufficient evidence to support a school-based curriculum suicide-prevention program for adolescents. The studies included in the review provide both significant and non-significant findings for similar outcomes, and both beneficial and harmful effects for participants.	1998	7/9(AMSTAR rating from the McMaster Health Forum)	0/9	9/9	9/9

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	Effectiveness of universal approaches to mental health promotion in schools (68)	Interventions evaluated in the studies included those that took a whole school approach, those that extended beyond the classroom to all or part of the school, and those that took a classroom approach. There was positive evidence of effectiveness for programs that adopted a whole-school approach, that were implemented continuously for more than one year, and that were aimed at promoting mental health rather than preventing mental illness. This suggests that universal school mental health promotion programs can be effective, and that long-term interventions promoting positive mental health are likely to be more successful than brief classroom-based mental illness prevention programs.	1999	4/9(AMSTAR rating from the McMaster Health Forum)	0/17	17/17	4/17
	Effectiveness of middle- and high-school-based suicide-prevention curricula for adolescents (113)	Interventions evaluated in the studies were of varying durations, and included video discussion lessons, three-phase interventions, participatory classes, curriculum vignette program, and the Signs of Suicide (SOS) Suicide Prevention Program. Despite evidence supporting the role of school-based programs (to prevent suicide among adolescents) in improving knowledge, attitudes and help-seeking behaviours, there is currently no evidence linking such prevention programs to reduced suicide rates.	2009	6/10(AMSTAR rating from the McMaster Health Forum)	0/8	8/8	8/8
	Effectiveness of screening as an approach for adolescent suicide prevention (56)	Interventions evaluated in the studies mostly took place in the high school setting, with a few taking place in hospital settings or residential treatment facilities. Interventions consisted mainly of questionnaires to evaluate suicide risk. Only two studies reported reductions in suicide attempts in youth after using a program with either a screening protocol or screening instrument. However, neither study offers any conclusive evidence about the effectiveness of screening in reducing suicide or	2006	3/9(AMSTAR rating from the McMaster Health Forum)	Not reported	0/17	17/17

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		suicide attempts. Youth suicide screening programs are thus promising for improving identification of students in need of treatment and help.					
	Review of suicide programs that have been evaluated for Canadian youth aged 10 to 24, and the ways in which new trends in the field of program evaluation may help guide efforts in suicide-program evaluation (32)	Six of the nine school programs that were identified led to improvements in knowledge about suicide, while one led to improvements in attitudes about suicide, and three led to improvements in skills required to intervene in the suicidal process. None of the programs showed an effect on suicidal ideation or suicide attempts. One of the three suicide-prevention centre programs led to a reduction in suicidal urgency, while another of the three led to reduction in suicidal ideation. One study evaluating the effects of gun control on overall suicide rates found inconclusive results.	1996	4/9(AMSTAR rating from the McMaster Health Forum)	15/15	12/15	15/15
	Efficacy and effectiveness of current suicide-prevention programs for children and youth (55)	The studies included in this review all evaluated school-based suicide-prevention programs. Based on findings from methodologically weak studies and inconsistent conclusions, there is insufficient evidence to either support or not to support curriculum-based suicide-prevention programs in schools. All primary studies reviewed, except for one, did not report or failed to report any harmful effects from suicide-prevention programs. The generalizability of the results from these studies to the Alberta setting is in question, as no Canadian studies on the effectiveness of suicide prevention in children and youth have been published since 1991.	2001	4/10(AMSTAR rating from the McMaster Health Forum)	0/12	0/12	11/12
	Review of the effectiveness of school-based curriculum suicide-prevention programs for adolescents (59)	The review suggests there is insufficient evidence to support school-based curriculum on suicide prevention for adolescents. There is some evidence to suggest the possibility of both beneficial and harmful effects of the program on some students, especially	4/10 (AMSTAR rating from McMaster	Not reported	0/11	0/11	11/11

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		more negative effects among males. Among the nine studies focussing on the effects of the suicide-prevention programs on students' attitudes related to suicide, five showed results in improved attitudes. The reviewed studies did not assess the evidence of the effectiveness of the programs in changing suicidal behaviour.	Health Forum)				
	Effectiveness of initiatives that promote health in schools for young people aged four to 19 (63)	The review highlights that school-based programs that promote mental health are effective. There is some evidence to suggest that programs on suicide prevention reduced suicide crisis. However, a few studies suggested that some programs may have harmful effects on young males and should be taken into policy considerations. The 'whole school approach' correlated with the effectiveness of the evaluated interventions. Key elements of this approach include school environment changes, development of intrapersonal skills in class, involvement of parents and the community, and active involvement of the school. Knowledge-based programs were found to be ineffective. Most of the studies involved entire school populations and so the review indicates the results can be generalized.	1/11 (AMSTAR rating from McMaster Health Forum)	Not reported	0/15	4/15	2/15
	Realist review to understand complex interventions that may be useful in a school-setting based on local needs and context (69)	The review found that education programs are useful for individuals living in rural areas with limited or no access to mental health services, individuals with poor knowledge, and ethnic minority populations who have cultural taboos on suicide. Components of suicide prevention that correlated with significant reduction in suicidality included: identifying and treating underlying mental illness; addressing the underlying risk factor of substance use; improving problem-solving skills; providing support and stress coping skills; and addressing cultural barriers and	2008	2/9 (AMSTAR rating from McMaster Health Forum)	0/9	Not reported	3/9

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		taboos around suicide. Screening can be a useful intervention in schools with well-established systems for self-harm and crisis management, or in high-risk students where a case manager is available. Process factors that increase the effectiveness of school-based suicide-prevention programs included: universal education and gatekeeper programs with staff; rising rates of suicide leading to staff motivation to receive proper education; raising awareness through different forms of presentation methods; tailoring interventions by target groups and high-risk individuals; and utilizing established interventions through the support of local and provincial support for resources. Components of suicide prevention that correlated with poor interventions included: clarifying myths about suicidal attempts and suicide; failing to engage parents and foster peer support; failing to address confidentiality concerns when seeking assistance; short durations; lacking family support and resources outside of school; and failing to address repeated suicide attempts.					
	Efficacy of school programs focussed on preventing suicide attempts in youth (52)	Of the 16 identified programs, two (Signs of Suicide and The Good Behaviour Game) had evidence to demonstrate a reduction in suicide attempts. Most programs had positive outcomes, such as encouraging life-skills development and reducing suicidal ideation. However, these programs were not found to be evidence-based and therefore limited evaluation data was available. In addition, no program examined the effectiveness of the programs in diverse populations. Therefore, no specific program was recommended, but a combination of programs was found to be most effective.	2012	10/10 (AMSTAR rating from Program in Policy Decision-making)	Not reported	Not reported	16/16

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	Effectiveness of school-based healthcare on the mental, sexual and reproductive health of adolescents (51)	Evidence on effectiveness of school-based healthcare with adolescents is limited. However, there is evidence that the program is popular and creates cost benefits by reducing health disparities between adolescents and access to secondary health resources. Three out of the 27 reviewed studies measured mental, reproductive and sexual health outcomes, with none of them being randomized controlled trials. The remaining studies focused on accessibility, clinic utilization and contextual factors. There is a need for more high-quality research and clearer definitions of school-based healthcare.	2012	3/11 (AMSTAR rating from McMaster Health Forum)	2/27	Not reported	4/27
	Effects of interventions aimed at changing the school environment, (i.e., the structural, relational or pedagogic features of school life), and the school environment on mental health outcomes for adolescents (70)	Within five controlled trials in nine papers and 23 studies in 30 cohort papers, there is limited evidence that the school environment affects adolescent emotional health outcomes. Two non-randomized trials found that a supportive school environment increased student emotional health outcomes, which contrasts with three randomized controlled trials finding no effect. Six cohort papers analyzing school-level factors found no effect. However, these studies found individual-level effects to be larger than multilevel effects. Additionally, some evidence was found to suggest that a student's future emotional health can be predicted by perceptions of teacher support and connectedness to schools.	2011	10/11 (AMSTAR rating from McMaster Health Forum)	0/39	Not reported	4/39
	Interventions to prevent and treat suicide and self-harm in young people (53)	Most studies evaluated psychological interventions and few involved treatment for young people with recognized mental disorders or substance abuse issues. The effectiveness of interventions within the trials was not evaluated.	2013	3/11 (AMSTAR rating from McMaster Health Forum)	Not reported	10/38	38/38
	Effectiveness of school-based mental health programs on secondary school adolescents (54)	Evidence for safety and program and cost-effectiveness is limited mainly due to a lack of rigorous research, the differences between school environments, and the complex nature of multi-sector collaborations. Four studies addressing suicide-	2012	2/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	4/26

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		prevention programs reported positive outcomes, but the evidence was limited for various reasons, such as not being able to demonstrate a reduction in death by suicide. The authors state that there needs to be better evaluation of interventions that are thought to be effective, cost-effective and accepted, as no program to date has been able to fulfil all three requirements.					
	School-based prevention, early intervention and postvention programs for suicide (67)	Programs included those targeting suicide, attempted suicide, suicidal ideation, and self-harm where the intent may have been suicide. Interventions encompassed universal awareness programs, interventions targeted at at-risk groups (e.g. gatekeeper programs, screening programs) or at individuals displaying suicidal behaviour, and postvention programs in response to a suicide. Universal awareness programs significantly reduced suicide behaviours and increased knowledge of suicide in all studies. A significant improvement in attitudes towards suicide was found in most studies. The effect on health-seeking behaviour was inconsistent. Gatekeeper training programs were found to: 1) increase knowledge of suicide (but there were mixed results as to whether these gains were maintained over time); 2) increase confidence dealing with suicide and suicide-related behaviours; 3) have a mixed effect on attitudes to suicide and suicide-related behaviours; and 4) increase knowledge and behaviours related to suicide prevention. Screening programs were generally sensitive enough to identify at-risk students who would have otherwise not been identified. Most studies also had low specificity with many false positives and negatives, and two studies found no increased distress detected from screening.	2011	5/10 (AMSTAR rating from McMaster Health Forum)	1/43	1/43	43/43

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Trials of indicated interventions for at-risk students found no improvement attributable to the interventions, but there was some evidence that interventions contributed to a faster reduction in suicidal behaviours, and one study detected lower levels of suicidal ideation after intervention. Postvention studies found no effect of the intervention on well-being, risk, post-traumatic stress disorder or high-intensity grief.					
	Review of evidence of suicide-prevention programming on help-seeking attitudes and behaviours in youths (45)	Psychoeducational programs generally do not increase help-seeking behaviour. However, combining multimodal interventions with another intervention such as screening have had an effect on help-seeking in some studies, but not in others. Combining pscyhoeducation with peer-help training did not exhibit an effect Gatekeeper training in two studies did not show improvements in attitudes or in help-seeking behaviour among school students. In one study, a decrease in help-seeking from parents and peers occurred. One other study found that gatekeeper training improved securing resources for students in need. Public service messaging has had mixed results. One simulation study found no effect on help-seeking attitudes. Another study found no change in knowledge of sources of help, but did reduce perceived barriers to help-seeking and result in an increase in those who sought help, though not specifically for a mental health problem.	Not Reported	1/10 (AMSTAR rating from McMaster Health Forum)	Not Reported	0/19	19/19
	Effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal	The most prominent focus of the literature to date has been on pharmaceutical interventions, but the results of these studies provide few indicators of a consistent	2006	9/10(AMSTAR rating from the McMaster	7/235	Not yet available	235/235

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	ideation, both in key risk groups and in the general population (34)	positive impact. There is evidence from a number of studies that the use of lithium in bipolar disorder may reduce attempted and completed suicide. Little evidence was identified regarding effective pharmaceutical intervention for self-harm. Some high-quality studies indicate the treatment of depression with fluvoxamine and sertraline may reduce suicidal ideation. Restrictions in access to lethal means, and service provision via specialist centres with highly trained personnel, can reduce rates of suicide. The use of individualized and intensive cognitive and behavioural therapies has shown promise in reducing attempted suicide and self-harm, with the most promising methods being cognitive behavioural therapy (CBT) and dialectical behavioural therapy (DBT). There is little evidence on the effectiveness of other non-pharmaceutical interventions for suicidal ideation.		Health Forum)			
	Effectiveness of interventions for adolescent suicide prevention, risk factors for youth suicide, and interventions for reducing suicide in youths (71;79) *Both reviews by Pompili et al. used identical searches and have similar content, and so are summarized together.	School-based programs for high-risk students are sometimes effective at reducing psychological risk factors and improving protective factors. They may also increase knowledge of available help resources. Some studies showed that the Signs of Suicide (SOS) program reduced attempted suicides by 40%, but has not had an effect on suicidal ideation or help-seeking behaviour. Studies evaluating whole-school approaches have not yielded much improvement in knowledge or attitude of students.	2008	1/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Skills training for high-risk students has improved protective factors and reduced risk factors. Behaviour management in primary grades reduced suicidality in later years. Behavioural change and strategy building for coping in the general school population decreased suicidal tendencies and improved coping. Psychosocial skill-building reduces suicidal risk (i.e. suicidal ideation and attitudes towards suicide) in adolescents and can be mostly sustained for nine months. Gatekeeper training has consistently improved knowledge and attitudes of teachers and students trained, but there is a dearth of evidence in terms of effectiveness and harms. Gatekeeper training for teachers was affected by the baseline status of the teacher and those working with distressed youth were more likely to ask about suicide consistently after training. Gatekeeper training for family, other people providing support and community members has not been effective. Parenting programs have been associated with reduction in self-harm. Screening students had low specificity and identified many false positives, even though it did have good sensitivity. Screening when tied to psychosocial therapy was effective at reducing suicidal risk factors and suicidal ideation. Postvention in this population has not shown benefit.					

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
Selective • Workplace-based prevention programs	No reviews identified						
Selective • Prison-based prevention programs	No reviews identified						
Selective • Programs for veterans and military personnel	Suicide risk in military organizations (in order to determine if military personnel are at increased risk for suicide), and the effects of preventive interventions in different civilian settings (37)	On average, suicide rates in currently serving military personnel are less than rates observed in the general population (for the same age and sex distribution). It is highly probable that the same broad range of risk factors, protective factors and triggers for suicidal behaviour identified in the general population also applies to military populations. Special opportunities for suicide prevention in military organizations include: education and awareness campaigns; screening and assessment; restriction of access to lethal means; media engagement; organizational interventions to mitigate work stress or strain; interventions to overcome barriers to care; and risk factors modification, among others.	Not reported	1/9 (AMSTAR rating from the McMaster Health Forum)	Not reported	Not reported	Not reported
	Suicidal self-directed violence and suicide prevention related to four areas of interest: 1) effectiveness of specific interventions for the reduction of suicidal self-directed violence in military and/or veteran populations; 2) lessons that can be learned from suicidal self-directed violence-prevention intervention research conducted outside the veterans and military personnel; and 3) effectiveness of referral and follow-up services for the reduction of suicidal self-directed violence (61)	The review found no randomized controlled trial studies of self-directed violence prevention interventions in the military or for veterans. There are mixed results for the interventions conducted outside of veteran and military settings, which includes pharmacotherapy and psychotherapy. No interventions were effective over others. The review found no randomized controlled trial studies of suicidal self-directed violence prevention referral and follow-up services in military or for veterans. There is insufficient to low-strength evidence for the	2011	6/11 (AMSTAR rating from McMaster Health Forum)	Not reported in detail – Description states: U.S., U.K, Canada, New Zealand, Australia	72/72	72/72

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		effectiveness of any referral and follow-up services in prevention of self-directed violence. No intervention was effective over others in the prevention of suicidal or self-directed violence. The review suggests clinicians should consider which intervention is likely to be effective based on the prior conditions of the veteran or military service member.					
	Suicide-prevention for veterans served by the U.S. Veterans Administration (VA) (114)	In a pre-post study, gatekeeper training increased knowledge and self-efficacy among (VA) staff. In a veteran and military personnel-specific systematic review, there was evidence that multicomponent interventions were more likely to reduce suicide, but there was limited evidence to make conclusions about effectiveness. Psychosocial interventions after suicide attempts were only minimally effective (based on moderate evidence). Means restriction likely has an effect on cause-specific suicide, but its effect on total suicides is unclear. Hotlines, outreach programs, peer counselling, treatment coordination programs, and new counselling programs had not been studied.	Not Reported	2/10 (AMSTAR rating from McMaster Health Forum)	Not Reported	Not Reported	Not Reported
	Suicide prevention programs for military and veteran populations (60)	Low quality studies (observational design) make up most of the research in this area. A study looking at the combination of training with crisis reference information lacked comparison to establish effect. Training of officers in one study led to a lower rate of suicides than in the comparison group, but many confounding factors were present. Similarly, training of all service members reduced suicides in other studies. A study looking at the combination of training, guidelines, increased capacity, screening and	2008	5/11 (AMSTAR rating from McMaster Health Forum)	0/7	0/7	7/7

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		surveillance showed a 33% decrease in death by suicide. This effect was reproduced in another country using a similar intervention. A study looking at the combination of training, psychosocial counselling, and surveillance reduced suicides to their lowest level in a decade in the service studied, though there was no baseline rate or trend provided in the comparison, and no assessment of confounding. Psychosocial intervention for gambling reduced suicidal ideation and suicide attempts during the treatment period. The following three studies on veterans were deemed "very low quality": One randomized controlled trial of dialectic behavioural therapy on veterans with borderline personality disorder reduced intentional self-harm (including suicide) by 80%. One study of veterans and substance misuse found no statistically significant difference after treatment. Treating depressed veterans with antidepressants (SSRI, non-SSRI, tricyclic antidepressants) decreased suicide rates.					
Selective • Drug misuse programs	Suicide prevention programs for military and veteran populations (60)	Low quality studies (observational design) make up most of the research in this area. A study looking at the combination of training with crisis reference information lacked comparison to establish effect. Training of officers in one study led to a lower rate of suicides than in the comparison group, but many	2008	5/11 (AMSTAR rating from McMaster Health Forum)	0/7	0/7	7/7

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		confounding factors were present. Similarly, training of all service members reduced suicides in other studies. A study looking at the combination of training, guidelines, increased capacity, screening, and surveillance showed a 33% decrease in death by suicide. This effect was reproduced in another country using a similar intervention. A study looking at the combination of training, psychosocial counselling, and surveillance reduced suicides to their lowest level in a decade in the service studied, though there was no baseline rate or trend provided in the comparison, and no assessment of confounding. Psychosocial intervention for gambling reduced suicidal ideation and suicide attempts during the treatment period. The following three studies on veterans were deemed "very low quality": One randomized controlled trial of dialectic behavioural therapy on veterans with borderline personality disorder reduced intentional self-harm (including suicide) by 80%. One study of veterans and substance misuse found no statistically significant difference after treatment. Treating depressed veterans with antidepressants (SSRI, non-SSRI, tricyclic antidepressants) decreased suicide rates.					
Indicated • Training and peer	Effectiveness of training gatekeepers for suicide prevention (77)	Gatekeepers are defined as people who have primary contact with those at risk of suicide, and who can identify them by recognizing suicidal risk factors.	Not reported	2/9 (AMSTAR rating from Program in	1/13	2/13 (Aboriginal population)	13/13

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
education		Gatekeepers are classified as designated (e.g. those who work in medicine, social work, nursing and psychology) or emergent (e.g. community members – clergy, police, teachers, counsellors – without formal training to intervene with someone at risk of suicide, but who are recognized by such at-risk individuals as potential gatekeepers). Gatekeeper training is a promising strategy to combat suicide, as it has been shown to positively affect the skills, attitudes and knowledge of those who undertake the training. Nevertheless, evidence is limited for the effects of gatekeeper training on suicide rates and ideation of at-risk individuals.		Policy Decision-making)			
	Effectiveness of education campaigns targeted at the general public to improve awareness of suicidal crises and depression (65)	Public awareness campaigns were divided into four main categories: short media campaigns, gatekeeper training, long national programs, and long local or community programs. The evidence suggests that public awareness programs contributed to a modest improvement in public knowledge of and attitudes towards depression or suicide, although most program evaluations did not assess the durability of the attitude changes. No study clearly showed that the awareness campaigns helped to increase care-seeking or decrease suicidal behaviour.	2007	3/9(AMSTAR rating from the McMaster Health Forum)	2/15	0/15	6/15
	Effectiveness of specific suicide-prevention interventions related to: awareness and education, screening, treatment interventions, lethal means restriction, and media (35)	The evidence indicated that both education of physicians in depression recognition and treatment, and restricting access to lethal means reduced suicide rates. Gatekeeper education also showed promise for decreasing suicide rates. Other methods, such as public education, screening programs, and media education, require more evidence of efficacy.	2005	4/10(AMSTAR rating from the McMaster Health Forum)	3/93	20/93	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Many universal or targeted educational interventions are multifaceted, so more research may be required to determine which components produce the desired outcomes.					
	Review of suicide programs that have been evaluated for Canadian youth aged 10 to 24, and the ways in which new trends in the field of program evaluation may help guide efforts in suicide-program evaluation (32)	Six of the nine school programs that were identified led to improvements in knowledge about suicide, while one led to improvements in attitudes about suicide, and three led to improvements in skills required to intervene in the suicidal process. None of the programs showed an effect on suicidal ideation or suicide attempts. One of the three suicide-prevention centre programs led to a reduction in suicidal urgency, while another of the three led to reduction in suicidal ideation. One study evaluating the effects of gun control on overall suicide rates found inconclusive results.	1996	4/9(AMSTAR rating from the McMaster Health Forum)	15/15	12/15	15/15
	To provide an inclusive understanding of nurses' responses to suicide and suicidal patients, in order to guide research that can in turn benefit nursing practice and guide nurses to care for suicidal patients in ways that facilitate suicide prevention and recovery (115)	Four key concepts emerged: 1) nurses' critical reflections on self, suicide and suicidal patients embedded in philosophical and relational perspectives; 2) nurses' attitudinal response to suicide and suicidal patients; 3) nurses' complex knowledge and professional role responsibilities caring for suicidal patients; and 4) nurses' desire for emotional and educational support services or resources in caring for suicidal patients.	2009	4/9(AMSTAR rating from the McMaster Health Forum)	3/26	0/26	26/26
	Epidemiologic characteristics and trends in suicide in Asia (76)	The research in Asia is limited with a lack of updated evidence for intervention programs, and risk and protective factors for suicide. Twenty-six intervention programs were examined that included six on the restriction of suicide means and 13	2011		0/26	14/26	26/26

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		exploring psychosocial education. While six interventions were seen as effective and 13 as promising for reducing suicide-related outcomes, several of these studies used intermediate or process outcomes, without direct measures to suicide rates. Studies showed the effects on different age and sex subgroups were not consistent, and not all subgroups benefitted from the interventions. Maintaining the effect from the intervention was found to be challenging after the intervention was discontinued. Additionally, Taiwan, South Korea and Japan were the only countries in Asia to have government-led suicide -prevention efforts, using methods similar to those in Western countries. However, the authors were critical about applying Western-based suicide programs without consideration to Asian specific socioeconomic-cultural context, believing they will fail. Based on the profiles of those who have died from suicide, the authors indicate that a public-health approach must be grounded in community-based and culturally-sensitive intervention strategies.					
	Review of evidence of suicide-prevention programming on help-seeking attitudes and behaviours in youths (45)	Psychoeducational programs generally do not increase help-seeking behaviour. However, combining multimodal interventions with another intervention such as screening have had an effect on help-seeking in some studies, but not in others. Combining pscyhoeducation with peer-help training did not exhibit an effect Gatekeeper training in two studies did not show improvements in attitudes or in help-seeking behaviour among school students. In one study, a decrease in help-seeking from parents and peers occurred. One other study found that gatekeeper training improved securing resources for students in	Not Reported	1/10 (AMSTAR rating from McMaster Health Forum)	Not Reported	0/19	19/19

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		need. Public service messaging has had mixed results. One simulation study found no effect on help-seeking attitudes. Another study found no change in knowledge of sources of help, but did reduce perceived barriers to help-seeking and result in an increase in those who sought help, though not specifically for a mental health problem.					
	Review of systematic reviews of effectiveness of multilevel suicide-prevention interventions, and identification of interventions that may have synergistic potential (41)	The effective interventions identified included: pharmacotherapy and cognitive behavioural therapy for depression at a primary care level; gatekeeper training (population level); screening of high risk groups (population level); means restriction (population level); hospitalization (targeted to psychiatric patients); telephone and emotional support targeting psychiatric patients; palliative care and rural community-based support for older adults; and ethnically-tailored community-wide public health programs (including video-focused educational interventions targeting ethnic minorities to modify family expectations of self-harm, and school-based initiatives to train staff and students how to respond to suicide). The review noted that gatekeeper training has generally been studied as part of a more comprehensive intervention, and so the specific impact of gatekeeper training is less clear. There is equivocal evidence on the effectiveness of public awareness at the population level , school-based intervention programs targeting children and adolescents, as well as psychotherapeutic, pharmaceutical, behavioural, and staff and parent training initiatives targeting children and adolescents. No explicit synergistic results were presented.	2011	7/11 (AMSTAR rating from McMaster Health Forum)	Not reported	1/6	5/6

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	Effectiveness of interventions for adolescent suicide prevention, risk factors for youth suicide, and interventions for reducing suicide in youths (71;79) *Both reviews by Pompili et al. used identical searches and have similar content, and so are summarized together.	School-based programs for high-risk students are sometimes effective at reducing psychological risk factors and improving protective factors. They may also increase knowledge of available help resources. Some studies showed the Signs of Suicide (SOS) program has reduced attempted suicides by 40%, but has not had an effect on suicidal ideation or help-seeking behaviour. Studies evaluating whole-school approaches have not yielded much improvement in knowledge or attitude of students. Skills training for high-risk students has improved protective factors and reduced risk factors. Behaviour management in primary grades reduced suicidality in later years. Behavioural change and strategy building for coping in the general school population decreased suicidal tendencies and improved coping. Psychosocial skill-building reduces suicidal risk (i.e. suicidal ideation and attitudes towards suicide) in adolescents and can be mostly sustained for nine months. Gatekeeper training has consistently improved knowledge and attitudes of teachers and students trained, but there is a dearth of evidence in terms of effectiveness and harms. Gatekeeper training for teachers was affected by the baseline status of the teacher with those working with distressed youth more likely to ask about suicide consistently after training. Gatekeeper training for family, other people providing support and community members has not been effective.	2008	1/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Parenting programs have been associated with reduction in self-harm. Screening students had low specificity and identified many false positives, even though it did have good sensitivity. Screening when tied to psychosocial therapy was effective at reducing suicidal risk factors and suicidal ideation. Postvention in this population has not shown benefit.					
	Suicide prevention programs for military and veteran populations (60)	Low quality studies (observational design) make up most of the research in this area. A study looking at the combination of training with crisis reference information lacked comparison to establish effect. Training of officers in one study led to a lower rate of suicides than in the comparison group, but many confounding factors were present. Similarly, training of all service members reduced suicides in other studies. A study looking at the combination of training, guidelines, increased capacity, screening, and surveillance showed a 33% decrease in death by suicide. This effect was reproduced in another country using a similar intervention. A study looking at the combination of training, psychosocial counselling, and surveillance reduced suicides to their lowest level in a decade in the service studied, though there was no baseline rate or trend provided in the comparison, and no assessment of confounding. Psychosocial intervention for gambling reduced suicidal ideation and suicide attempts during the	2008	5/11 (AMSTAR rating from McMaster Health Forum)	0/7	0/7	7/7

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		treatment period. The following three studies on veterans were deemed "very low quality": One randomized controlled trial of dialectic behavioural therapy on veterans with borderline personality disorder reduced intentional self-harm (including suicide) by 80%. One study of veterans with substance misuse found no statistically significant difference after treatment. Treating depressed veterans with antidepressants (SSRI, non-SSRI, tricyclic antidepressants) decreased suicide rates.					
Indicated • Providing assistance to general practitioners and health service planners	Epidemiology and main risk factors for suicidal behaviour among young people, with a review of the evidence for the recognition, management and prevention of adolescent suicidal behaviour by primary care physicians (73)	The number and rate of suicides among youth have increased over the past two decades, with the highest rates among males aged 20-24 years. Risk factors include high rates of psychiatric illness or mental disorders. There is a strong association between risk factors and suicidal behaviour among youth of low socio-economic status and poor educational background, those with previous suicide attempts or persistent suicidal ideation, or family backgrounds and environments with dysfunctional or difficult circumstances. Interventions that are population-based try to prevent development of suicidal behaviour in individuals, while targeted interventions try to prevent suicidal behaviour in youth at high risk of suicide.	Not reported	3/11(AMSTAR rating from the McMaster Health Forum)	3/300	Not yet available	300/300
	Effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal ideation, both in key risk groups and in the general population (34)	The most prominent focus of the literature to date has been on pharmaceutical interventions, but the results of these studies provide few indicators of a consistent positive impact. There is evidence from a number of studies that the use of lithium in bipolar disorder may reduce	2006	9/10(AMSTAR rating from the McMaster Health Forum)	7/235	Not yet available	235/235

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		attempted and completed suicide. Little evidence was identified regarding effective pharmaceutical intervention for self-harm. Some high quality studies indicate the treatment of depression with fluvoxamine and sertraline may reduce suicidal ideation. Restrictions in access to lethal means, and service provision via specialist centres with highly trained personnel, can reduce rates of suicide. The use of individualized and intensive cognitive and behavioural therapies has shown promise in reducing attempted suicide and self-harm, with the most promising methods being cognitive behavioural therapy (CBT) and dialectical behavioural therapy (DBT). There is little evidence on the effectiveness of other non-pharmaceutical interventions for suicidal ideation.					
	Interventions for suicide prevention in elderly adults (78)	Screening followed by education and follow-up by physicians reduced death by suicide in men followed by psychiatrists, and women followed-up by any physician. Telephone counselling programs have had some positive results with one study showing a reduction in death by suicide in women, but not men. In other studies it has reduced risk factors. Training physicians to provide specific depression management led to a significant reduction in suicidal ideation, but was limited to those with major depression and effects were greater in women. Treating depression reduced suicidal ideation rapidly,	2011	4/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		but in high-risk groups thoughts about death took longer to resolve. Cognitive behavioural therapy over six months improved psychological health. A 16-week psychotherapy intervention in those with suicidal ideation, death ideation, or past suicidal attempt reduced suicidal ideation.					
	Review of treatments for parasuicide in order to assist clinicians, health service planners and administrators to develop and improve interventions for parasuicide, and to decrease prevalence (116)	The review suggests there is a need for more research on treatments for suicide prevention. Eight key steps emerged as being useful to improve treatment: 1) establish case registries with parasuicide as the prime risk factor among high-risk individuals; 2) evaluate quality of care in order to establish practice guidelines that may be used for program-evaluation tools; 3) evaluate training to include empirically supported treatment for parasuicide and provisioned by staff with appropriate training; 4) evaluate fidelity to treatment models such as treatment manuals and training; 5) evaluate outcomes through the inclusion of appropriate case registries and factors such as parasuicide, cause of death, outpatient and crisis services and cost of treatment; 6) evaluate local programs to determine effectiveness and disseminate the results; 7) provide infrastructure supports; and 8) implement quality improvement through established local health systems	2001	1/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported
Indicated • Assistance to family/friends of high-risk individuals	Effectiveness of person-to-person parent- and caregiver-targeted interventions on risk and protective behaviours and health outcomes (72)	Interventions contained three common elements: education component, discussion component, and opportunity for caregiver to practise new skills. There is sufficient evidence to indicate that person-to-person interventions delivered to parents and caregivers, and aimed at modifying adolescent risk and	2007	4/11 (AMSTAR rating from the McMaster Health Forum)	0/12	Not yet available	1/12

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		protective behaviours, are effective at reducing adolescent risk behaviours and yielding improvements in adolescent health.					
	Effectiveness of interventions for adolescent suicide prevention, risk factors for youth suicide, and interventions for reducing suicide in youths (71;79) *Both reviews by Pompili et al. used identical searches and have similar content, and so are summarized together.	School-based programs for high-risk students are sometimes effective at reducing psychological risk factors and improving protective factors. They may also increase knowledge of available help resources. Some studies showed the Signs of Suicide (SOS) program reduced attempted suicides by 40%, but has not had an effect on suicidal ideation or help-seeking behaviour. Studies evaluating whole-school approaches have not yielded much improvement in knowledge or attitude of students. Skills training for high-risk students has improved protective factors and reduced risk factors. Behaviour management in primary grades reduced suicidality in later years. Behavioural change and strategy building for coping in the general school population decreased suicidal tendencies and improved coping. Psychosocial skill-building reduces suicidal risk (i.e. suicidal ideation and attitudes towards suicide) in adolescents, and can be mostly sustained for nine months. Gatekeeper training has consistently improved knowledge and attitudes of teachers and students trained, but there is a dearth of evidence in terms of effectiveness and harms. Gatekeeper training for teachers was affected by the baseline status of the teacher with those working with distressed youth more likely to ask about suicide consistently after training. Gatekeeper training for family, other people providing	2008	1/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		support and community members has not been effective. Parenting programs have been associated with reduction in self-harm. Screening students had low specificity and identified many false positives, even though it did have good sensitivity. Screening when tied to psychosocial therapy was effective at reducing suicidal risk factors and suicidal ideation. Postvention in this population has not shown benefit.					
Indicated • Telephone-based suicide-prevention services	Mobile device apps that address mental health symptoms or disorders (117)	None of the identified studies reported on suicide-related behaviour or outcomes.	2013	6/10 (AMSTAR rating from Program in Policy Decision-making)	Not Reported	0/7	0/7
	Review of tertiary preventive interventions aiming to prevent repetition of suicidal behaviours and suicide attempts (118)	Only two pharmacological treatments proved significantly superior to a placebo. Eight out of 16 psychological treatments proved superior to treatment as usual. Cognitive-behavioural therapy and psychoanalytically oriented therapy are promising interventions. Two visit or phone contact approaches and one intensive outreach program proved effective over treatment as usual.	2010	1/10(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	35/35
	Effectiveness of telemedicine health services for delivering psychiatric and mental health care (80)	Mixed results were found in two telephone-based studies. One study found no significant difference in suicide attempts or treatment attendance among individuals who had already attempted suicide. A 10-year longitudinal study of a telephone hotline and emergency service found significantly fewer suicides by users. This latter service worked well for elderly females, but not males.	2006	3/11 (AMSTAR rating from McMaster Health Forum)	Not reported	59/65	2/65
	Effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal	The most prominent focus of the literature to date has been on pharmaceutical interventions, but the results of these studies provide few indicators of a consistent	2006	9/10(AMSTAR rating from the McMaster	7/235	Not yet available	235/235

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	ideation, both in key risk groups and in the general population (34)	positive impact. There is evidence from a number of studies that the use of lithium in bipolar disorder may reduce attempted and completed suicide. Little evidence was identified regarding effective pharmaceutical intervention for self-harm. Some high quality studies indicate the treatment of depression with fluvoxamine and sertraline may reduce suicidal ideation. Restrictions in access to lethal means, and service provision via specialist centres with highly trained personnel, can reduce rates of suicide. The use of individualized and intensive cognitive and behavioural therapies has shown promise in reducing attempted suicide and self-harm, with the most promising methods being cognitive behavioural therapy (CBT) and dialectical behavioural therapy (DBT). There is little evidence on the effectiveness of other non-pharmaceutical interventions for suicidal ideation.		Health Forum)			
	Review of systematic reviews of effectiveness of multilevel suicide-prevention interventions, and identification of interventions that may have synergistic potential (41)	The effective interventions identified included: pharmacotherapy and cognitive behavioural therapy for depression at a primary care level; gatekeeper training (population level); screening of high risk groups (population level); means restriction (population level); hospitalization (targeted to psychiatric patients); telephone and emotional support targeting psychiatric patients; palliative care and rural community-based support for older adults; and ethnically-tailored community-wide public health programs (including video-focused educational interventions targeting ethnic minorities to modify	2011	7/11 (AMSTAR rating from McMaster Health Forum)	Not reported	1/6	5/6

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		family expectations of self-harm, and school-based initiatives to train staff and students how to respond to suicide). The review noted that gatekeeper training has generally been studied as part of a more comprehensive intervention, and so the specific impact of gatekeeper training is less clear. There is equivocal evidence on the effectiveness of public awareness at the population level , school-based intervention programs targeting children and adolescents, as well as psychotherapeutic, pharmaceutical, behavioural, and staff and parent training initiatives targeting children and adolescents . No explicit synergistic results were presented.					
	Interventions for suicide prevention in elderly adults (78)	Screening followed by education and follow-up by physicians reduced death by suicide in men followed by psychiatrists, and women followed-up by any physician. Telephone counselling programs have had some positive results with one study showing a reduction in death by suicide in women, but not men. In other studies it has reduced risk factors. Training physicians to provide specific depression management led to a significant reduction in suicidal ideation, but was limited to those with major depression, and effects were greater in women. Treating depression reduced suicidal ideation rapidly, but in high-risk groups thoughts about death took longer to resolve. Cognitive behavioural therapy over six months improved psychological health. A 16-week	2011	4/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		psychotherapy intervention in those with suicidal ideation, death ideation, or past suicidal attempt reduced suicidal ideation.					
Indicated • Postvention	Effectiveness of post-suicide intervention programs (postvention programs), defined as prevention strategies that target individuals recently bereaved by the death of a loved one (74;75)* *Both reviews contain largely overlapping content and are therefore summarized together.	Interventions evaluated in the studies include school-based interventions (e.g. counselling for those bereaved, debriefing for whole school populations and crisis response training for school personnel), family-based interventions (e.g. support group, outreach, or education), and community-based interventions (e.g. suicide reporting guidelines, support services, media and education. There was insufficient evidence to determine whether there was a protective effect of any postvention program on the number of suicide deaths or suicide attempts. Few positive effects of school-based postvention programs were found, while one study reported negative effects of suicide postvention. However, strategies that show promise include gatekeeper training to improve knowledge of crisis intervention (with positive effects on depression and suicide rates), provision of outreach at the time of suicide to family member survivors (with positive results on use of services to assist in the grieving process), and bereavement support group interventions (with positive short-term reductions in emotional distress). Support group interventions may have different impacts depending on gender and severity of distress. There is insufficient evidence for the use of media reporting guidelines for suicide and suicide attempt, although the evidence shows promise for their ability to reduce suicides and suicide attempts.	2009	3/10(AMSTAR rating from the McMaster Health Forum)	1/16 (some not reported)	Not yet available	16/16
	Short-term (i.e., immediately after the intervention) and long-term (i.e., follow-up) effects of both preventive and treatment interventions for complicated	CG is defined as a combination of separation distress and cognitive, emotional and behavioural symptoms that can develop after the death of a significant other. Symptoms must last at least six months and cause significant impairment in social, occupational and	2007	5/11(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	3/14

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	grief (CG) (later renamed Prolonged Grief Disorder) in bereaved adults (119)	other important areas of functioning. Preventive interventions included counselling, group therapy and writing therapy. Treatment interventions included various forms of psychological therapy. Results from the preventive grief intervention studies provide inconsistent support for their effectiveness. Specifically, there was a lack of significant effect of preventive interventions on CG immediately after the intervention, which evolves to a fairly negative (but non-significant) effect at follow-up. Treatment interventions appear to be effective in both short-term and long-term alleviation of CG symptoms. In contrast to preventive interventions, the positive effects of treatment interventions increases significantly over time.					
	What is known about perceived needs for help on the part of suicide bereaved in different parts of the world (120)	The bereaved in the studies agreed about a common need for peer and social support, and that professional help must be adapted to and offered with respect for individual needs. In societies in which the stigma of suicide has diminished, the bereaved experience similar needs for help. However, in societies in which there are taboos and sanctions connected to suicide, it is difficult to discuss their need for help. More culturally sensitive research is needed to clarify how each community understands suicide and reacts to families who have lost someone to suicide.	Not reported	0/10(AMSTAR rating from the McMaster Health Forum)	0/5	Not yet available	5/5
	School-based prevention, early intervention, and postvention programs for suicide (67)	Programs included those targeting suicide, attempted suicide, suicidal ideation, and self-harm where the intent may have been suicide. Interventions encompassed universal awareness programs, interventions targeted at at-risk groups (e.g. gatekeeper programs, screening programs) or at individuals displaying suicidal behaviour, and postvention programs in response to a suicide.	2011	5/10 (AMSTAR rating from McMaster Health Forum)	1/43	1/43	43/43

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Universal awareness programs significantly reduced suicide behaviours and increased knowledge of suicide in all studies. A significant improvement in attitudes towards suicide was found in most studies. The effect on health-seeking behaviour was inconsistent. Gatekeeper training programs were found to: 1) increase knowledge of suicide (but there were mixed results as to whether these gains were maintained over time); 2) increase confidence dealing with suicide and suicide-related behaviours; 3) have a mixed effect on attitudes to suicide and suicide-related behaviours; and 4) increase knowledge and behaviours related to suicide prevention. Screening programs were generally sensitive enough to identify at-risk students, who would have otherwise not been identified. Most studies also had low specificity with many false positives and negatives, and two studies found no increased distress detected from screening. Trials of indicated interventions for at-risk students found no improvement attributable to the interventions, but there was some evidence that interventions contributed to a faster reduction in suicidal behaviours, and one study detected lower levels of suicidal ideation after intervention. Postvention studies found no effect of the intervention on well-being, risk, post-traumatic stress disorder or high-intensity grief.					
	Effectiveness of interventions for adolescent suicide prevention, risk factors for youth suicide, and interventions for reducing suicide	School-based programs for high-risk students are sometimes effective at reducing psychological risk factors and improving protective factors. They may also increase knowledge of available help resources.	2008	1/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	in youths (71;79) *Both reviews by Pompili et al. used identical searches and have similar content, and so are summarized together.	Some studies showed the Signs of Suicide (SOS) program reduced attempted suicides by 40%,, but has not had an effect on suicidal ideation or help-seeking behaviour. Studies evaluating whole-school approaches have not yielded much improvement in knowledge or attitude of students. Skills training for high-risk students has improved protective factors and reduced risk factors. Behaviour management in primary grades reduced suicidality in later years. Behavioural change and strategy building for coping in the general school population decreased suicidal tendencies and improved coping. Psychosocial skill-building reduces suicidal risk (i.e. suicidal ideation and attitudes towards suicide) in adolescents, and can be mostly sustained for nine months. Gatekeeper training has consistently improved knowledge and attitudes of teachers and students trained, but there is a dearth of evidence in terms of effectiveness and harms. Gatekeeper training for teachers was affected by the baseline status of the teacher with those working with distressed youth more likely to ask about suicide consistently after training. Gatekeeper training for family, other people providing support and community members has not been effective. Parenting programs have been associated with reduction in self-harm. Screening students had low specificity and identified					

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		many false positives, even though it did have good sensitivity. Screening when tied to psychosocial therapy was effective at reducing suicidal risk factors and suicidal ideation. Postvention in this population has not shown benefit.					

Appendix 2: Systematic reviews evaluating treatment interventions for suicide prevention

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
Screening (case identification)	Effectiveness of community-based depression screening (CDS) with follow-up on the completed suicide risk for older adults aged 65 and over (49)	The implementation of universal prevention programs involving CDS and health education is associated with reduced risk of death by suicide among older adults. However, there were very few studies included in the review to demonstrate an association between CDS and reduced risk, suggesting gender difference in the effectiveness of the intervention.	2007	4/11 (AMSTAR rating from Program in Policy Decision-making)	0/5	0/5	5/5
	Effectiveness of screening as an approach for adolescent suicide prevention (56)	Interventions evaluated in the studies mostly took place in the high school setting, with a few taking place in hospital settings or residential treatment facilities. Interventions consisted mainly of questionnaires to evaluate suicide risk. Only two studies reported reductions in suicide attempts in youth after using a program with either a screening protocol or screening instrument. However, neither study offers any conclusive evidence about the effectiveness of screening in reducing suicide or suicide attempts. Youth suicide screening programs are thus promising for improving identification of students in need of treatment and help.	2006	3/9(AMSTAR rating from the McMaster Health Forum)	Not reported	0/17	17/17
	Effectiveness of specific suicide-preventive interventions related to: awareness and education, screening, treatment interventions, lethal-means restriction, and media reporting (35)	The evidence indicated that both education of physicians in depression recognition and treatment, and restricting access to lethal means reduced suicide rates. Gatekeeper education also showed promise for decreasing suicide rates. Other methods, such as public education, screening programs, and media education, require more evidence of efficacy.	2005	4/10(AMSTAR rating from the McMaster Health Forum)	3/93	20/93	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Many universal or targeted educational interventions are multifaceted, so more research may be required to determine which components produce the desired outcomes.					
	Health effects of routine primary care screening for major depressive disorder among children and adolescents aged 7 to 18 (81)	No data was found describing health outcomes among screened and unscreened populations. However, the (small and methodologically limited) literature on diagnostic screening test accuracy indicates several screening instruments have performed well among adolescents. Other literature indicates that selective serotonin reuptake inhibitors, psychotherapy and combined treatment are effective in increasing response rates and reducing depressive symptoms. Treating depressed youth with selective serotonin reuptake inhibitors may be associated with a small increased risk of suicidality, and should only be considered if judicious clinical monitoring is possible.	2006	7/10(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	9/27
	Interventions aimed at suicidal elderly persons, with the goal of identifying successful strategies and areas needing further exploration (82)	Most reviews focused on reduction of risk factors through depression screening and treatment, and decreasing isolation. Programs were mostly efficient for women when gender was taken into account. Empirical evaluation of programs for at-risk elderly adults was positive, with most studies showing reduction in suicide ideation and suicide rate. Strategies should aim to improve resilience, positive aging, the engagement of family and community gatekeepers, and the use of telecommunications to reach vulnerable elderly adults, and evaluate effects of means restriction and physician education on elderly suicide.	2009	2/9(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	11/11
	Suicide risk in military organizations (in order to determine if military personnel are at increased risk for suicide), and the effects of preventive interventions in different civilian settings (37)	On average, suicide rates in currently serving military personnel are less than rates observed in the general population (for the same age and sex distribution). It is highly probable that the same broad range of	Not reported	1/9 (AMSTAR rating from the McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		risk factors, protective factors and triggers for suicidal behaviour identified in the general population also applies to military populations. Special opportunities for suicide prevention in military organizations include: education and awareness campaigns; screening and assessment; restriction of access to lethal means; media engagement; organizational interventions to mitigate work stress or strain; interventions to overcome barriers to care; and risk factors modification, among others.					
	The diagnostic and predictive accuracy of Beck Hopelessness Scale (BHS) as a predictor of non-fatal self-harm and suicide (121)	In the review, one study indicated the BHS is designed to identify a potential for suicide. In its use for screening, the pooled sensitivity and specificity were 0.80 and 0.42, both with high precision. Individuals who score nine or above on the BHS were 11 times more likely to commit suicide than those scoring less than nine. The review suggests the ability for BHS to identify a potential for suicide is notably lower than the validation studies. The standard cut-off point for BHS is unlikely to be used to identify a group for treatment, as the cut-off point may identify more individuals than the available treatment. The limited number of included studies prevents drawing conclusions.	2006	4/11 (AMSTAR rating from McMaster Health Forum)	1/10	Not reported	4/10
	Validity of screening instruments to identify adult legal offenders at risk of suicide and self-harm (122)	The review identifies the instruments for assessing the probability of individuals at risk of suicide rather than diagnosis. The Suicide Checklist (SCL), the Suicide Concerns for Offenders in Prison Environments (SCOPE), and the Suicide Potential Scale all had sensitivities greater than 70% (depending on the cut-off used) with the Suicide Potential Scale having a specificity of 80% as well and the SCL having a sensitivity of 70%. Risk prevalence varied heavily by study which would	2004	5/10 (AMSTAR rating from McMaster Health Forum)	3/5	Not reported	5/5

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		have an impact on positive and negative predictive values.					
	School-based prevention, early intervention, and postvention programs for suicide (67)	Programs included those targeting suicide, attempted suicide, suicidal ideation, and self-harm where the intent may have been suicide. Interventions encompassed universal awareness programs, interventions targeted at at-risk groups (e.g. gatekeeper programs, screening programs) or at individuals displaying suicidal behaviour, and postvention programs in response to a suicide. Universal awareness programs significantly reduced suicide behaviours and increased knowledge of suicide in all studies. A significant improvement in attitudes towards suicide was found in most studies. The effect on health-seeking behaviour was inconsistent. Gatekeeper training programs were found to: 1) increase knowledge of suicide (but there were mixed results as to whether these gains were maintained over time); 2) increase confidence dealing with suicide and suicide-related behaviours; 3) have a mixed effect on attitudes to suicide and suicide-related behaviours; and 4) increase knowledge and behaviours related to suicide prevention. Screening programs were generally sensitive enough to identify at-risk students, who would have otherwise not been identified. Most studies also had low specificity with many false positives and negatives, and two studies found no increased distress detected from screening. Trials of indicated interventions for at-risk students found no improvement attributable to the interventions, but there was some evidence that	2011	5/10 (AMSTAR rating from McMaster Health Forum)	1/43	1/43	43/43

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		interventions contributed to a faster reduction in suicidal behaviours and one study detected lower levels of suicidal ideation after intervention. Postvention studies found no effect of the intervention on well-being, risk, post-traumatic stress disorder or high-intensity grief.					
	Accuracy, safety, and efficacy of screening for suicide risk, and for the safety and efficacy of treatment for those identified as at risk for suicide (83)	One trial identified no benefits of screening in the short term. Three trials identified no serious adverse effects of screening. Screening tools had a sensitivity and specificity of 83–100% and 81–98% respectively in adults. In high risk adolescents, the sensitivity and specificity was 52–87% and 60–85%. Psychotherapeutic treatment led to a statistically significant 32% reduction in suicide attempts compared to usual care groups, but the number of suicide attempts in each study was extremely variable. Psychotherapy had no beneficial effect on suicidal ideation. Enhanced usual care (improved quality or format of usual care) did not reduce suicide or suicide attempts to a statistically significant degree in any study. Medication (lithium) was studied in one trial and was found to not significantly reduce suicide attempts or suicidal ideation. The only three suicides, however, did occur in the placebo group. No harms of treatment were identified in adults, though there was a statistically insignificant increase in suicide attempts in adolescents.	2012	10/10 (AMSTAR rating from Program in Policy Decision-making)	2/43 (Reported for only 43 of 56 studies)	28/56	56/56
	Effectiveness of interventions for adolescent suicide prevention, risk factors for youth suicide, and	School-based programs for high-risk students are sometimes effective at reducing psychological risk factors and improving protective factors. They may	2008	1/11 (AMSTAR rating from McMaster	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	interventions for reducing suicide in youths (71;79) *Both reviews by Pompili et al. used identical searches and have similar content, and so are summarized together.	also increase knowledge of available help resources. Some studies showed the Signs of Suicide (SOS) program reduced attempted suicides by 40%, but has not had an effect on suicidal ideation or help-seeking behaviour. Studies evaluating whole-school approaches have not yielded much improvement in knowledge or attitude of students. Skills training for high-risk students has improved protective factors and reduced risk factors. Behaviour management in primary grades reduced suicidality in later years. Behavioural change and strategy building for coping in the general school population decreased suicidal tendencies and improved coping. Psychosocial skill-building reduces suicidal risk (i.e. suicidal ideation and attitudes towards suicide) in adolescents, and can be mostly sustained for nine months. Gatekeeper training has consistently improved knowledge and attitudes of teachers and students trained, but there is a dearth of evidence in terms of effectiveness and harms. Gatekeeper training for teachers was affected by the baseline status of the teacher with those working with distressed youth more likely to ask about suicide consistently after training. Gatekeeper training for family, other people providing support and community members has not been effective. Parenting programs have been associated with reduction in self-harm.		Health Forum)			

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Screening students had low specificity and identified many false positives, even though it did have good sensitivity. Screening when tied to psychosocial therapy was effective at reducing suicidal risk factors and suicidal ideation. Postvention in this population has not shown benefit.					
Pharmaceutical interventions	Effectiveness of interventions commonly used to reduce psychological harm among children and adolescents exposed to traumatic events (93)	Interventions evaluated in the studies include individual cognitive-behavioural therapy, group cognitive behavioural therapy, play therapy, art therapy, psychodynamic therapy, pharmacologic therapy for symptomatic children and adolescents, and psychological debriefing regardless of symptoms. There is strong evidence to support the role of individual and group cognitive-behavioural therapy in reducing psychological harm in symptomatic children and adolescents exposed to trauma. There is insufficient evidence, however, to determine the effectiveness of play therapy, art therapy, pharmacologic therapy, psychodynamic therapy, and psychological debriefing in reducing psychological harm in this population.	2007	5/11(AMSTAR rating from the McMaster Health Forum)	0/30	Not yet available	0/30
	Effectiveness of treatments of patients who have deliberately harmed themselves (including self-poisoning and self-injury) (98)	Interventions include psychosocial or psychopharmacological treatment (versus standard or less intensive types of aftercare). There remains considerable uncertainty about which forms of psychosocial and physical treatments of self-harm patients are most effective, with inclusion of insufficient numbers of patients in trials being the main limiting factor. Results of small single trials that have been associated with significant reductions in repetition of deliberate self-harm should be interpreted with caution.	1999	10/11(AMSTAR rating from the McMaster Health Forum)	1/23	Not yet available	0/23 (all focused on self-harm, not on completed suicides; however, review was meant to inform strategies to prevent

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Meanwhile, there is a need for larger trials of treatments associated with reduced rates of repetition of deliberate self-harm.					completed suicides)
	Comparison of suicide rates with versus without long-term lithium treatment in major affective disorders (85)	Suicide risk was consistently lower during long-term treatment of major affective illnesses with lithium in all studies in the meta-analysis, including a few involving treatment randomization. In a total of 5,647 patients (33,473 patient-years of risk) from 22 studies, suicide was 82% less frequent during lithium treatment (0.159 versus 0.875 deaths/100 patient-years).	2000	7/11(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	22/22
	Effects of lithium treatments on suicides and attempt (84)	The findings indicate major reductions of suicidal risks (attempts > suicides) with lithium maintenance therapy in unipolar, bipolar II, and bipolar I disorder, to overall levels close to general population rates. These major benefits in syndromes mainly involving depression encourage evaluation of other treatments aimed at reducing mortality in the depressive and mixed phases of bipolar disorder and unipolar major depression.	2002	1/11(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	34/34
	Effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal ideation, both in key risk groups and in the general population (34)	The most prominent focus of the literature to date has been on pharmaceutical interventions, but the results of these studies provide few indicators of a consistent positive impact. There is evidence from a number of studies that the use of lithium in bipolar disorder may reduce attempted and completed suicide. Little evidence was identified regarding effective pharmaceutical intervention for self-harm. Some high-quality studies indicate the treatment of depression with fluvoxamine and sertraline may reduce suicidal ideation. Restrictions in access to lethal means, and service	2006	9/10(AMSTAR rating from the McMaster Health Forum)	7/235	Not yet available	235/235

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		provision via specialist centres with highly trained personnel, can reduce rates of suicide. The use of individualized and intensive cognitive and behavioural therapies has shown promise in reducing attempted suicide and self-harm, with the most promising methods being cognitive behavioural therapy (CBT) and dialectical behavioural therapy (DBT). There is little evidence on the effectiveness of other non-pharmaceutical interventions for suicidal ideation.					
	Review of tertiary preventive interventions aiming to prevent repetition of suicidal behaviours and suicide attempts (118)	Only two pharmacological treatments proved significantly superior to a placebo. Eight out of 16 psychological treatments proved superior to treatment as usual. Cognitive-behavioural therapy and psychoanalytically oriented therapy are promising interventions. Two visit or phone contact approaches and one intensive outreach program proved effective over treatment as usual.	2010	1/10(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	35/35
	Effectiveness of treatments of patients with repetition of deliberate self-harm (self-poisoning or self-injury) (87)	Interventions included psychosocial or physical treatments (versus control or comparison treatments). Assertive outreach may help patient retention during treatment. Some promising results include positive impact from problem-solving therapy, depot flupenthixol for recurrent self-harm, long-term psychotherapy for females with borderline personality disorder and recurrent self-harm, and provision of cards with emergency contacts. The review indicates there is currently insufficient evidence to determine which forms of treatment are most effective for patients who deliberately harm themselves. The review suggests the need for larger trials to determine the appropriate effectiveness of	1997	8/11 (AMSTAR rating from McMaster Health Forum)	1/20	1/20	1/20

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		treatments.					
	Effectiveness of lithium therapy to prevent suicide and self-harm in unipolar and bipolar mood disorders (86)	Lithium significantly reduced the odds of suicide by 87% and all-cause mortality by 36% (where most deaths were form suicide) as compared to placebo. Lithium did not significantly reduce the odds of suicide as compared to other active pharmaceutical treatment. Similar results were found in subgroups of only unipolar or only bipolar mood disorders.	2013	9/11 (AMSTAR rating from McMaster Health Forum)	2/48	48/48	11/48
	Summary of the development and essential content of the first evidence- and consensus-based German-language guideline for diagnosis and treatment of bipolar disorders (88)	In patients suffering from bipolar disorder, investing time and a robust therapeutic relationship is important. Lithium treatment for long-term maintenance is recommended to reduce suicide and attempted suicide. Psychotherapy focusing initially on suicidality should also be considered. Antidepressants, anti-psychotics, valproate and lamotrigine are not suitable for acute treatment of suicidality.	2010	1/10 (AMSTAR rating from McMaster Health Forum)	Not Reported	Not Reported	Not Reported
	Accuracy, safety and efficacy of screening for suicide risk, and for the safety and efficacy of treatment for those identified as at risk for suicide (83)	One trial identified no benefits of screening in the short term. Three trials identified no serious adverse effects of screening. Screening tools had a sensitivity and specificity of 83–100% and 81–98% respectively in adults. In high-risk adolescents, the sensitivity and specificity was 52–87% and 60–85%. Psychotherapeutic treatment led to a statistically significant 32% reduction in suicide attempts compared to usual care groups, but the number of suicide attempts in each study was extremely variable. Psychotherapy had no beneficial effect on suicidal ideation. Enhanced usual care (improved quality or format of usual care) did not reduce suicide or suicide attempts to a statistically significant degree in any study. Medication (lithium) was studied in one trial and	2012	10/10 (AMSTAR rating from Program in Policy Decision-making)	2/43 (Reported for only 43 of 56 studies)	28/56	56/56

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		was found to not significantly reduce suicide attempts or suicidal ideation. The only three deaths from suicide, however, did occur in the placebo group. No harms of treatment were identified in adults, though there was a statistically insignificant increase in suicide attempts in adolescents.					
	Effectiveness of interventions for alleviating the symptoms and behaviours associated with mood and anxiety disorders as well as self-harm (102)	Eight studies showed a significant improvement in depression symptoms. A meta-analysis of these results showed a reduction in depressive symptoms with group cognitive behavioural therapy. Six trials noted a significant improvement in anxiety symptoms. One trial (problem-solving group therapy intervention) measuring self-harm as an outcome observed no significant reduction from the intervention.	2007	7/11 (AMSTAR rating from McMaster Health Forum)	0/10	3/10	1/10
	Effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal ideation, both in key risk groups and in the general population (34)	The most prominent focus of the literature to date has been on pharmaceutical interventions, but the results of these studies provide few indicators of a consistent positive impact. There is evidence from a number of studies that the use of lithium in bipolar disorder may reduce attempted and completed suicide. Little evidence was identified regarding effective pharmaceutical intervention for self-harm. Some high-quality studies indicate the treatment of depression with fluvoxamine and sertraline may reduce suicidal ideation. Restrictions in access to lethal means, and service provision via specialist centres with highly trained personnel, can reduce rates of suicide.	2006	9/10(AMSTAR rating from the McMaster Health Forum)	7/235	Not yet available	235/235

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		The use of individualized and intensive cognitive and behavioural therapies has shown promise in reducing attempted suicide and self-harm, with the most promising methods being cognitive behavioural therapy (CBT) and dialectical behavioural therapy (DBT). There is little evidence on the effectiveness of other non-pharmaceutical interventions for suicidal ideation.					
	Effectiveness of psychological therapies and antidepressant medication for treating depressive disorder in children and adolescents (111)	In one study, treatment by psychotherapy with follow-ups of up to 36 weeks as compared to pharmacotherapy was shown to roughly reduce the incidence of suicide-related adverse events by half (suicidal ideation, suicide attempts). Comparing standardized suicidal ideation scores, odds of an individual on psychotherapy experiencing suicidal ideation was reduced by 74% as compared to an individual on pharmacotherapy. This effect was still seen at six to nine months. Evidence was equivocal comparing the combination of pharmacotherapy and psychotherapy versus pharmacotherapy alone. One study had results favouring combination therapy, one study had mixed results with favouring different interventions if looking at suicide attempts or suicidal ideation, and one study found no difference at all. Meta-analysis of suicidal ideation scores showed no significant differences between interventions utilizing continuous data from the score, or a discrete outcome using a cut-off score. Comparing combination therapy to psychotherapy alone, there was approximately a 20% reduction in suicide-related events (suicide attempts or suicidal ideation). However, from the meta-analysis of suicidal ideation scores, there was no significant	2011	10/11 (AMSTAR rating from McMaster Health Forum)	0/10	10/10	4/10

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		difference in the odds between interventions, whether continuous or discrete outcomes were used, and regardless of the time point used between immediate post-intervention to 12 months of follow-up. Finally, the one study comparing combination therapy to psychotherapy with a placebo medication found no suicide-related events and did not look at suicidal-ideation scores. However, of five individuals presenting to emergency care with worsening suicidality, one was in the combination therapy group while four were in the psychotherapy with placebo group.					
	Interventions for suicide prevention in elderly adults (78)	Screening followed by education and follow-up by physicians reduced death by suicide in men followed by psychiatrists, and women followed-up by any physician. Telephone counselling programs have had some positive results with one study showing a reduction in death by suicide in women, but not men. In other studies it has reduced risk factors. Training physicians to provide specific depression management led to a significant reduction in suicidal ideation, but was limited to those with major depression, and effects were greater in women. Treating depression reduced suicidal ideation rapidly, but in high risk groups thoughts about death took longer to resolve. Cognitive behavioural therapy over six months improved psychological health. A 16-week psychotherapy intervention in those with suicidal ideation, death ideation, or past suicidal attempt	2011	4/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		reduced suicidal ideation.					
	Suicide prevention programs for military and veteran populations (60)	Low-quality studies (observational design) make up most of the research in this area. A study looking at the combination of training with crisis reference information lacked comparison to establish effect. Training of officers in one study led to a lower rate of suicides than in the comparison group, but many confounding factors were present. Similarly, training of all service members reduced suicides in other studies. A study looking at the combination of training, guidelines, increased capacity, screening, and surveillance showed a 33% decrease in death by suicide. This effect was reproduced in another country using a similar intervention. A study looking at the combination of training, psychosocial counselling, and surveillance reduced suicides to their lowest level in a decade in the service studied, though there was no baseline rate or trend provided in the comparison, and no assessment of confounding. Psychosocial intervention for gambling reduced suicidal ideation and suicide attempts during the treatment period. The following three studies on veterans were deemed "very low quality": One randomized controlled trial of dialectic behavioural therapy on veterans with borderline personality disorder reduced intentional self-harm (including suicide) by 80%.	2008	5/11 (AMSTAR rating from McMaster Health Forum)	0/7	0/7	7/7

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		One study of veterans with substance misuse found no statistically significant difference after treatment. Treating depressed veterans with antidepressants (SSRI, non-SSRI, tricyclic antidepressants) decreased suicide rates.					
Electroconvulsive therapy	No reviews identified						
Neurosurgery	No reviews identified						
Intensive care plus outreach General hospital admission	Effectiveness of emergency department (ED)-based, post-ED, and ED transition interventions for pediatric patients with suicide-related ED visits (89)	ED-based interventions included: an enhanced discharge plan to improve treatment adherence with outpatient therapy. Post-ED interventions included cognitive-behavioural therapy, interpersonal skills training and problem solving, and community-based outreach with referral planning. ED transition interventions included referral with telephone/home-based support contacts for the patient, psychiatric support until longer-term care was in place, and outpatient treatment sessions for the patient and parent. The one and only study on ED-based intervention showed the intervention was effective in increasing treatment adherence. One of the six studies on post-ED interventions found increased adherence with service referral in patients who received community nurse home visits compared to simple placement referral at discharge. All three ED transition intervention studies reported reduced risk of subsequent suicide, reduced suicide-related hospitalizations and increased likelihood of treatment completion. Thus, transition interventions are most promising for reducing suicide-related outcomes.	2009	9/11 (AMSTAR rating from Program in Policy Decision-making)	1/10	Not yet available	10/10

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	Effectiveness of day care, outpatient care and community care for suicidal patients (90)	There was insubstantial evidence to indicate day hospital care was superior to outpatient care in terms of psychiatric symptoms, and no evidence to suggest they were better or worse than outpatient treatment in clinical or social outcomes, or cost. Most studies on community interventions (such as nurse home visits) or inpatient and community interventions reported no statistically significant reduction in repetition of suicidal behaviour compared to standard care (provided with outpatient appointments) at one-year follow-up.	Not reported	7/9 (AMSTAR rating from Program in Policy Decision-making)	0/6	Not yet available	6/6
	Review of systematic reviews of effectiveness of multilevel suicide-prevention interventions, and identification of interventions that may have synergistic potential (41)	The effective interventions identified included: pharmacotherapy and cognitive behavioural therapy for depression at a primary care level; gatekeeper training (population level); screening of high risk groups (population level); means restriction (population level); hospitalization (targeted to psychiatric patients); telephone and emotional support targeting psychiatric patients; palliative care and rural community-based support for older adults; and ethnically-tailored community-wide public health programs (including video-focused educational interventions targeting ethnic minorities to modify family expectations of self-harm, and school-based initiatives to train staff and students how to respond to suicide). The review noted that gatekeeper training has generally been studied as part of a more comprehensive intervention, and so the specific impact of gatekeeper training is less clear. There is equivocal evidence on the effectiveness of public awareness at the population level, school-based intervention programs targeting children and adolescents, as well as psychotherapeutic, pharmaceutical, behavioural, and staff and parent	2011	7/11 (AMSTAR rating from McMaster Health Forum)	Not reported	1/6	5/6

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		training initiatives targeting children and adolescents . No explicit synergistic results were presented.					
Cognitive behavioural therapies	Effectiveness of emergency department (ED)-based, post-ED, and ED transition interventions for pediatric patients with suicide-related ED visits (89)	ED-based interventions included an enhanced discharge plan to improve treatment adherence with outpatient therapy. Post-ED interventions included cognitive-behavioural therapy, interpersonal skills training and problem solving, and community-based outreach with referral planning. ED transition interventions included referral with telephone/home-based support contacts for the patient, psychiatric support until longer-term care was in place, and outpatient treatment sessions for the patient and parent. The one and only study on ED-based intervention showed the intervention was effective in increasing treatment adherence. One of the six studies on post-ED interventions found increased adherence with service referral in patients who received community nurse home visits compared to simple placement referral at discharge. All three ED transition intervention studies reported reduced risk of subsequent suicide, reduced suicide-related hospitalizations and increased likelihood of treatment completion. Thus, transition interventions are most promising for reducing suicide-related outcomes.	2009	9/11 (AMSTAR rating from Program in Policy Decision-making)	1/10	Not yet available	10/10
	Effectiveness of interventions commonly used to reduce psychological harm among children and adolescents exposed to traumatic event (93)	Interventions evaluated in the studies include individual cognitive-behavioural therapy, group cognitive behavioural therapy, play therapy, art therapy, psychodynamic therapy, pharmacologic therapy for symptomatic children and adolescents, and psychological debriefing regardless of	2007	5/11(AMSTAR rating from the McMaster Health Forum)	0/30	Not yet available	0/30

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		symptoms. There is strong evidence to support the role of individual and group cognitive-behavioural therapy in reducing psychological harm in symptomatic children and adolescents exposed to trauma. There is insufficient evidence, however, to determine the effectiveness of play therapy, art therapy, pharmacologic therapy, psychodynamic therapy, and psychological debriefing in reducing psychological harm in this population.					
	Effectiveness of cognitive behavioural therapies (CBTs) in reducing suicide behaviour (123)	The results indicate an overall highly significant effect for CBT on reduction of suicide behaviour. In particular, subgroup analyses show a significant treatment effect for adult samples (but not adolescent), individual treatments (but not group), and for CBT compared to minimal treatment or treatment as usual (but not when compared to another active treatment). Despite the results supporting the use of CBT in reducing suicidal ideation and behaviours, there is evidence of publication bias, which tempers the optimism in the findings.	2006	6/11(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	25/28
	Psychiatric management of poor compliance of suicide attempters with aftercare, guaranteed inpatient shelter to suicide attempters, psychosocial crisis intervention, and cognitive behavioural treatment (92)	There were considerable differences in study design and therapeutic protocols amongst studies included, thus making a single pooled analysis difficult. A pooled analysis of studies on psychiatric management of poor compliance showed no significant effect on repetition of suicide attempts. Studies of psychosocial crisis intervention and studies of guaranteed inpatient shelter in cases of emergency showed no significant reduction in repeated suicide attempts. Pooled results from four studies on cognitive behavioural therapies, however, showed a	1995	3/10(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	15/15

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		significant preventive effect on repeated suicide attempts. Only the cognitive behavioural approach seems to have a beneficial effect, though due to methodological variability, the results may be too optimistic and additional research is required to establish the merits of this intervention.					
	Effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal ideation, both in key risk groups and in the general population (34)	The most prominent focus of the literature to date has been on pharmaceutical interventions, but the results of these studies provide few indicators of a consistent positive impact. There is evidence from a number of studies that the use of lithium in bipolar disorder may reduce attempted and completed suicide. Little evidence was identified regarding effective pharmaceutical intervention for self-harm. Some high quality studies indicate the treatment of depression with fluvoxamine and sertraline may reduce suicidal ideation. Restrictions in access to lethal means, and service provision via specialist centres with highly trained personnel, can reduce rates of completed suicide. The use of individualized and intensive cognitive and behavioural therapies has shown promise in reducing attempted suicide and self-harm, with the most promising methods being cognitive behavioural therapy (CBT) and dialectical behavioural therapy (DBT). There is little evidence on the effectiveness of other non-pharmaceutical interventions for suicidal ideation.	2006	9/10(AMSTAR rating from the McMaster Health Forum)	7/235	Not yet available	235/235

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	Review of tertiary preventive interventions aiming to prevent repetition of suicidal behaviours and suicide attempts (118)	Only two pharmacological treatments proved significantly superior to a placebo. Eight out of 16 psychological treatments proved superior to treatment as usual. Cognitive-behavioural therapy and psychoanalytically oriented therapy are promising interventions. Two visit or phone contact approaches and one intensive outreach program proved effective over treatment as usual.	2010	1/10 (AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	35/35
	Interventions for adolescents and young adults who have presented to a clinical setting with behaviours (such as previous suicide attempt, suicidal ideation, and deliberate self-harm) (94)	Only one study found a difference between the treatment group (individual cognitive behavioural therapy) and control group (treatment as usual). All other studies found no differences between treatment and control groups. The evidence regarding effective interventions for adolescents and young adults with suicide attempts, deliberate self-harm and suicidal ideation is thus extremely limited.	2010	9/11(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	15/15
	Evaluation of whether cognitive behavioural therapy confers additional benefit to antidepressant treatment to treat depressive symptoms, unipolar depression, suicidality, impairment and global improvement in adolescents aged 11 to 18 with DSM-IV defined episode of depression (124)	The findings indicate that there is no evidence of any significant additional benefit for cognitive behavioural therapy in combination of antidepressant treatment for depressive symptoms, suicidality, or global improvement in the short- or long-term (12 weeks and 26–34 weeks respectively). After acute antidepressant medication, there was a decrease in suicidality within the four studies reporting this factor.	2010	5/11 (AMSTAR rating from McMaster Health Forum)	0/5	5/5	4/5
	Effectiveness of more versus less intensive therapies in reducing suicidal depression and behaviour in individuals with borderline personality disorder (91)	The evidence suggests both less (100 hours or less over a maximum of 12 months) and more (over 100 hours over a minimum of 12 months) intensive treatments can effectively reduce depression and suicidal behaviour in individuals with borderline personality disorder. As both types showed significant reductions in suicidal behaviour, delivering more intensive treatments was concluded to be questionable by the authors. Clinicians should be encouraged to offer the least intensive therapies	2013	2/11 (AMSTAR rating from McMaster Health Forum)	Not reported	6/6	6/6

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		for patient groups.					
	Effectiveness of interventions for alleviating the symptoms and behaviours associated with mood and anxiety disorders as well as self-harm (102)	Eight studies showed a significant improvement in depression symptoms. A meta-analysis of these results showed a reduction in depressive symptoms with group cognitive behavioural therapy. Six trials noted a significant improvement in anxiety symptoms. One trial (problem-solving group therapy intervention) measuring self-harm as an outcome observed no significant reduction from the intervention.	2007	7/11 (AMSTAR rating from McMaster Health Forum)	0/10	3/10	1/10
	Interventions for suicide prevention in elderly adults (78)	Screening followed by education and follow-up by physicians reduced death by suicide in men followed by psychiatrists, and women followed-up by any physician. Telephone counselling programs have had some positive results with one study showing a reduction in death by suicide in women, but not men. In other studies it has reduced risk factors. Training physicians to provide specific depression management led to a significant reduction in suicidal ideation, but was limited to those with major depression and effects were greater in women. Treating depression reduced suicidal ideation rapidly, but in high-risk groups thoughts about death took longer to resolve. Cognitive behavioural therapy over six months improved psychological health. A 16-week psychotherapy intervention in those with suicidal ideation, death ideation, or past suicidal attempt reduced suicidal ideation.	2011	4/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported
Inpatient-based therapies	Effectiveness of day care, outpatient care and community care for	There was insubstantial evidence to indicate day hospital care was superior to outpatient care in	Not reported	7/9 (AMSTAR rating from	0/6	Not yet available	6/6

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	suicidal patients (90)	terms of psychiatric symptoms, and no evidence to suggest they were better or worse than outpatient treatment in clinical or social outcomes, or cost. Most studies on community interventions (such as nurse home visits) or inpatient and community interventions reported no statistically significant reduction in repetition of suicidal behaviour compared to standard care (provided with outpatient appointments) at one-year follow-up.		Program in Policy Decision-making)			
Outpatient-based therapies	Effectiveness of day care, outpatient care and community care for suicidal patients (90)	There was insubstantial evidence to indicate day hospital care was superior to outpatient care in terms of psychiatric symptoms, and no evidence to suggest they were better or worse than outpatient treatment in clinical or social outcomes, or cost. Most studies on community interventions (such as nurse home visits) or inpatient and community interventions reported no statistically significant reduction in repetition of suicidal behaviour compared to standard care (provided with outpatient appointments) at one-year follow-up.	Not reported	7/9 (AMSTAR rating from Program in Policy Decision-making)	0/6	Not yet available	6/6
	Effects of interventions for problem drinking on injuries and their antecedents (62)	The evidence suggests interventions for problem drinking may be effective in the reduction of injuries and injury deaths, but the data are not conclusive. Three trials showed reductions in suicides after interventions (brief physician intervention and follow-up telephone call, rehabilitation program, motivational intervention), though these were small and not statistically significant. One trial reported an increase in suicide by one case after physician assessment and brief intervention for other medical issues, though this was a small and not statistically significant increase. In addition,	2002	9/11 (AMSTAR rating from McMaster Health Forum)	1/23	1/23	8/23

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		one trial reported three suicides among 36 participants who received multi-modal behaviour therapy, whereas there were two suicides among 36 participants who received one year of psychiatry therapy. One study reported reduction of suicide attempts following telephone aftercare contacts.					
	Effectiveness of suicide prevention from follow-up contact interventions with discharged inpatient psychiatry and emergency department patients (95)	Follow-up contact interventions (postal mail, electronic mail, or in-person visits) with discharged patients appear to reduce suicidal behaviour. Of the 11 examined studies, five had a significant reduction in suicidal behaviour, four showed mixed results gravitating towards a preventive effect, and two had no effect.	2011	3/11 (AMSTAR rating from McMaster Health Forum)	Not reported	11/11	11/11
Home-based therapy	Effectiveness, acceptability and cost of mental health services that provide an alternative to inpatient care for children and young people (aged 5 to 18) with serious mental health conditions requiring specialist services (96)	The alternative mental health services evaluated include four models of care: multi-systemic therapy (MST) at home (in which therapists provide therapy to the child and the family in their home); intensive home treatment (provision of therapy to the child in their home); intensive home-based crisis intervention (focusing on the child and family, and teaching skills in relationship-building, reframing of problems, anger management, communication and cognitive-behavioural therapy); and specialist outpatient services (by a range of health care professionals in clinics). MST was shown to improve some behaviours in children. Intensive home treatment did not lead to greater improvements in children who received this service compared to those who did not. Intensive home-based crisis intervention delivered small improvements to children who received this service. Specialist outpatient services did not lead to any improvements for children who received this service compared to those who did not. The evidence in the review provides little guidance for	2007	9/10(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	1/7

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		the development of these types of services.					
Psychosocial interventions	Effectiveness of family-based psychosocial interventions in community settings for people with schizophrenia or schizophrenia-like conditions, compared with standard care (100)	Family intervention may reduce hospitalization and relapse rates, although treatment effects of trials may be overestimated due to poor methodological quality. The review did not find data to suggest that family intervention either prevents or promotes suicide.	2008	11/11 (AMSTAR rating from Program in Policy Decision-making)	1/42	42/42	2/42
	Effectiveness of additional psychosocial interventions following an episode of self-harm in reducing the likelihood of subsequent suicide (97)	Psychosocial interventions evaluated in the studies involve individual psychotherapy such as cognitive-behavioural therapy, interpersonal psychotherapy and dialectical behaviour therapy. There is insufficient evidence that psychosocial interventions following an episode of self-harm have marked effects on the likelihood of subsequent suicide.	2005	7/11(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	18/18
	Effectiveness of psychosocial interventions for the prevention of psychological disorders in law enforcement officers (99)	Psychosocial interventions evaluated in the studies include stress management programs versus psycho-educational interventions, mental imaging training at home, counselling group sessions, circuit weight training, visuo-motor behaviour rehearsal, social skills training versus problem-solving skills training, and aerobic program (including theory) versus theory on exercise program. There is currently evidence only from small and low-quality trials with minimal data suggesting police officers benefit from psychosocial interventions in terms of physical symptoms and psychological symptoms (e.g. anxiety, depression, sleep problems, anger, PTSD, marital issues and distress). No data on adverse effects were available.	2008	11/11(AMSTAR rating from the McMaster Health Forum)	1/10	Not yet available	0/10
	Effectiveness of psychosocial interventions for adolescents aged 10 to 18 presenting with suicidal	Most interventions evaluated in the studies fall in the realm of cognitive-behavioural therapy, family-oriented therapy, group therapy, and community	2010	7/11 (AMSTAR rating from the McMaster	0/18	Not yet available	18/18

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	thoughts or behaviour (103)	education, among others. Intervention group participants were less likely to have suicidal and self-harm events compared to control group participants at post-test. However, when studies assessed outcome at a later period than immediately after the intervention (i.e. at follow-up), intervention group participants were slightly more likely to have suicidal and self-harm events than control group participants. Intervention group participants were slightly less likely to report suicidal ideation than control group participants at both post-test and follow-up.		Health Forum)			
	Effectiveness of treatments of patients who have deliberately harmed themselves (including self-poisoning and self-injury) (98)	Interventions include psychosocial or psychopharmacological treatment (versus standard or less intensive types of aftercare). There remains considerable uncertainty about which forms of psychosocial and physical treatments of self-harm patients are most effective, with inclusion of insufficient numbers of patients in trials being the main limiting factor. Results of small single trials that have been associated with significant reductions in repetition of deliberate self-harm should be interpreted with caution. Meanwhile, there is a need for larger trials of treatments associated with reduced rates of repetition of deliberate self-harm.	1999	10/11(AMSTAR rating from the McMaster Health Forum)	1/23	Not yet available	0/23 (all focused on self-harm, not on completed suicides; however, review was meant to inform strategies to prevent completed suicides)
	Effectiveness of more versus less intensive therapies in reducing suicidal depression and behaviour in individuals with borderline personality disorder (91)	The evidence suggests both less (100 hours or less over a maximum of 12 months) and more (over 100 hours over a minimum of 12 months) intensive treatments can effectively reduce depression and suicidal behaviour in individuals with borderline personality disorder. As both types showed significant reductions in suicidal behaviour, delivering more intensive treatments was concluded to be questionable by the authors. Clinicians should	2013	2/11 (AMSTAR rating from McMaster Health Forum)	Not reported	6/6	6/6

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		be encouraged to offer the least intensive therapies for patient groups.					
	Effectiveness of interventions for alleviating the symptoms and behaviours associated with mood and anxiety disorders as well as self-harm (102)	Eight studies showed a significant improvement in depression symptoms. A meta-analysis of these results showed a reduction in depressive symptoms with group cognitive behavioural therapy. Six trials noted a significant improvement in anxiety symptoms. One trial (problem-solving group therapy intervention) measuring self-harm as an outcome observed no significant reduction from the intervention.	2007	7/11 (AMSTAR rating from McMaster Health Forum)	0/10	3/10	1/10
	Effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal ideation, both in key risk groups and in the general population (34)	The most prominent focus of the literature to date has been on pharmaceutical interventions, but the results of these studies provide few indicators of a consistent positive impact. There is evidence from a number of studies that the use of lithium in bipolar disorder may reduce attempted and completed suicide. Little evidence was identified regarding effective pharmaceutical intervention for self-harm. Some high-quality studies indicate the treatment of depression with fluvoxamine and sertraline may reduce suicidal ideation. Restrictions in access to lethal means, and service provision via specialist centres with highly trained personnel, can reduce rates of completed suicide. The use of individualized and intensive cognitive and behavioural therapies has shown promise in reducing attempted suicide and self-harm, with the most promising methods being cognitive behavioural therapy (CBT) and dialectical behavioural therapy (DBT).	2006	9/10(AMSTAR rating from the McMaster Health Forum)	7/235	Not yet available	235/235

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		There is little evidence on the effectiveness of other non-pharmaceutical interventions for suicidal ideation.					
	Effectiveness of interventions for adolescent suicide prevention, risk factors for youth suicide, and interventions for reducing suicide in youths (71;79) *Both reviews by Pompili et al. used identical searches and have similar content, and so are summarized together.	School-based programs for high-risk students are sometimes effective at reducing psychological risk factors and improving protective factors. They may also increase knowledge of available help resources. Some studies showed the Signs of Suicide (SOS) program reduced attempted suicides by 40%, but has not had an effect on suicidal ideation or help-seeking behaviour. Studies evaluating whole-school approaches have not yielded much improvement in knowledge or attitude of students. Skills training for high-risk students has improved protective factors and reduced risk factors. Behaviour management in primary grades reduced suicidality in later years. Behavioural change and strategy building for coping in the general school population decreased suicidal tendencies and improved coping. Psychosocial skill-building reduces suicidal risk (i.e. suicidal ideation and attitudes towards suicide) in adolescents, and can be mostly sustained for nine months. Gatekeeper training has consistently improved knowledge and attitudes of teachers and students trained, but there is a dearth of evidence in terms of effectiveness and harms. Gatekeeper training for teachers was affected by the baseline status of the teacher with those working with distressed youth more likely to ask about suicide consistently after	2008	1/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		training. Gatekeeper training for family, other people providing support and community members has not been effective. Parenting programs have been associated with reduction in self-harm. Screening students had low specificity and identified many false positives, even though it did have good sensitivity. Screening when tied to psychosocial therapy was effective at reducing suicidal risk factors and suicidal ideation. Postvention in this population has not shown benefit.					
Psychotherapy	Effectiveness of interventions commonly used to reduce psychological harm among children and adolescents exposed to traumatic events (93)	Interventions evaluated in the studies include individual cognitive-behavioural therapy, group cognitive behavioural therapy, play therapy, art therapy, psychodynamic therapy, pharmacologic therapy for symptomatic children and adolescents, and psychological debriefing regardless of symptoms. There is strong evidence to support the role of individual and group cognitive-behavioural therapy in reducing psychological harm in symptomatic children and adolescents exposed to trauma. There is insufficient evidence, however, to determine the effectiveness of play therapy, art therapy, pharmacologic therapy, psychodynamic therapy, and psychological debriefing in reducing psychological harm in this population.	2007	5/11(AMSTAR rating from the McMaster Health Forum)	0/30	Not yet available	0/30
	Effectiveness, acceptability and cost of mental health services that provide an alternative to inpatient care for children and young people (ages 5 to 18 years) with serious	The alternative mental health services evaluated include four models of care: multi-systemic therapy (MST) at home (in which therapists provide therapy to the child and the family in their home); intensive home treatment (provision of therapy to the child	2007	9/10(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	1/7

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	mental health conditions requiring specialist services (96)	in their home); intensive home-based crisis intervention (focusing on the child and family, and teaching skills in relationship-building, reframing of problems, anger management, communication and cognitive-behavioural therapy); and specialist outpatient services (by a range of healthcare professionals in clinics). MST was shown to improve some behaviours in children. Intensive home treatment did not lead to greater improvements in children who received this service compared to those who did not. Intensive home-based crisis intervention delivered small improvements to children who received this service. Specialist outpatient services did not lead to any improvements for children who received this service compared to those who did not. The evidence in the review provides little guidance for the development of these types of services.					
	Effectiveness of depression-focussed psychotherapeutic treatments on suicidal ideation, risk, and hopelessness (125)	With 14 studies examining the effects of psychotherapy on depression (three for suicidal risk and ideation, and 11 for hopelessness), the evidence was insufficient to determine if psychotherapeutic treatments reduce suicide risk in patients experiencing depression. No studies were found examining suicide attempts or completed suicides. Psychotherapy appears to have a small, positive effect in reducing suicidal ideation and risk, though not statistically significant. The effect on hopelessness was higher and statistically significant. Publication bias was found and adjusted for, reducing the overall effect size.	2012	3/11 (AMSTAR rating from McMaster Health Forum)	0/13	13/13	13/13
	Effectiveness of interpersonal psychotherapy versus cognitive therapy in individuals with a diagnosis of major depressive disorder (101)	The benefits and harms of both interventions addressing depressive symptoms did not appear to differ significantly. All of the trials had a high risk of bias and did not report adverse effects. Future research on this topic is needed, reporting on	2010	7/11 (AMSTAR rating from McMaster Health Forum)	Not reported	21/21	0/21

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		suicidality and adverse effects, with longer follow-up and lower risk of bias and random errors.					
	Effects of psychological and psychosocial interventions after attempted suicide and deliberate self-harm (108)	Interventions included in the study are: cognitive behavioural therapy, psychodynamic therapy, problem-solving interventions, family interventions, minimal intervention approach, multimodal intervention, inpatient and outpatient treatment and therapist continuity. The review indicates none of the interventions were successful in the reduction of the incidence of death by suicide. Five of the 25 studies found significant reduction in deliberate-self harm. There is some evidence to suggest cognitive behaviour therapy such as dialectical behaviour therapy may be effective in the reduction of recurrent deliberate self-harm. Two studies involving psychodynamic intervention found significant reduction in suicidal ideation, habitual self-harming behaviour and self-reported suicide attempts. Problem-solving approaches did not result in a significant reduction of habitual deliberate self-harm, but this approach may be beneficial for improvement in suicidal ideation. The combination of cognitive-behavioural interventions, dialectical behaviour therapy, problem solving, and psychodynamic-oriented group therapy also showed reduction in recurrence of self-harm, even though It did not significantly reduce the incidence of recurrence. The evidence for minimal interventions, inpatient treatment, outreach treatment, therapist continuity, low frequency long-term intervention, and high	2003	3/11 (AMSTAR rating from McMaster Health Forum)	Not reported	2/25	25/25

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		frequency short- term interventions were all not significant or had mixed results. Outreach treatment and therapist continuity, however, did improve compliance. The review emphasizes the need for long-term prevention, the enhancement of therapeutic alliance, and for interventions that aim at improving patient resilience to psychosocial and suicidal crises.					
	Effectiveness of dialectical behaviour therapy for suicide prevention in adolescents aged 18 or younger (105)	The evidence indicates that dialectical behaviour therapy is effective for the reduction of suicidality, self-harm behaviours and suicide ideation. However, this evidence is limited in adolescents and patients with other psychiatric conditions besides borderline personality disorder.	2009	3/11 (AMSTAR rating from McMaster Health Forum)	Not reported	7/7	7/7
	Effects of psychosocial treatment of interventions for reducing adolescent suicidal behaviour with an emphasis on developmental nuances of the interventions (126)	Studies were divided into two groups: random allocation of suicidal youth to the intervention under study or comparison group, and quasi-experimental studies. There is insufficient evidence that any intervention reviewed is effective in reducing suicide attempts, and most interventions did not reduce suicidal ideation or self-harm. There is some evidence that interventions improve service utilization and delivery including compliance with medical recommendations, aftercare, and reduction of hospitalization. The review indicates developmental appropriateness of interventions may play a small role in reducing suicidality; but may be more important with regards to increasing effectiveness and generalizability of positive therapeutic changes.	2009	2/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	13/13
	Counselling and psychotherapy for suicide prevention and people who deliberately self-harm (110)	The findings indicate strong evidence from the meta-analyses on the effectiveness of psychotherapy and counselling compared to the controlled treatment. There is some evidence for the effectiveness of psychological interventions for	2009	8/11 (AMSTAR rating from McMaster Health Forum)	0/15	2/15	15/15

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		patients at risk of suicide. However, there are mixed results on which type of therapy is more effective. From the qualitative and process studies, there is an emphasis on strengthening the therapeutic alliance. In the findings of the meta-synthesis, important themes and subthemes emerged including: 1. therapist qualities (respect, understanding and non-judgemental); 2. therapy components (duration and contact) 3. theoretical framework; and 4. therapy techniques (group work, skills training, telephone coaching, silence, advice, validation, and therapist internalized voice). Several barriers to utilizing counselling and psychotherapy were indicated in the process and qualitative studies, which included therapist characteristics, therapy components such as language and balance, secrecy among patients, transferring to real-life situations, responsibilities of the profession, lack of training in working with suicidal clients, and nature of suicide and self-harm.					
	Psychotherapeutic interventions for borderline personality disorder and their effect on symptoms, severity and other psychopathology (106)	One study found that dialectical behavioural therapy significantly reduced suicidality scores by 1.26 standard deviations (low-quality evidence). Three studies when pooled showed that dialectical behavioural therapy significantly reduced parasuicidality by 0.54 standard deviations (moderate-quality evidence). One additional study on dialectic behavioural therapy showed a non-significant relative risk of 1.1 for self-harm (low-quality evidence).	2011	11/11 (AMSTAR rating from McMaster Health Forum)	1/28	28/28	12/28
	Effectiveness of dialectical behavioural therapy in general and on suicide and self-injurious behaviour, as well as for borderline	Only 11 studies were suitable for pooling in the meta-analysis. Restricting the meta-analysis to six randomized controlled trials yielded a non-specific pooled effect of 0.23. Including a moderator effect	2009	7/11 (AMSTAR rating from McMaster Health Forum)	Not reported	16/16	15/16

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	personality disorder (127)	for the difference between borderline specific trails and those not specific, yielded a significant effect size of 0.60. Insignificant results are seen when pooled results of all 11 studies had a crude effect size of 0.37. By including the impact of borderline-specific randomized controlled trials, the effect size is significant at an estimated 0.56					
	State of women veteran's health (107)	Women veterans with borderline personality disorder had reduced suicidal ideation and parasuicidal acts after dialectic behavioural therapy.	2004	4/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	1/182
	Accuracy, safety and efficacy of screening for suicide risk, and for the safety and efficacy of treatment for those identified as at risk for suicide (83)	One trial identified no benefits of screening in the short term. Three trials identified no serious adverse effects of screening. Screening tools had a sensitivity and specificity of 83–100% and 81–98% respectively in adults. In high risk adolescents, the sensitivity and specificity was 52–87% and 60–85%. Psychotherapeutic treatment led to a statistically significant 32% reduction in suicide attempts compared to usual care groups, but the number of suicide attempts in each study was extremely variable. Psychotherapy had no beneficial effect on suicidal ideation. Enhanced usual care (improved quality or format of usual care) did not reduce suicide or suicide attempts to a statistically significant degree in any study. Medication (lithium) was studied in one trial and was found to not significantly reduce suicide attempts or suicidal ideation. The only three suicides, however, did occur in the placebo group. No harms of treatment were identified in adults, though there was a statistically insignificant increase	2012	10/10 (AMSTAR rating from Program in Policy Decision-making)	2/43 (Reported for only 43 of 56 studies)	28/56	56/56

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		in suicide attempts in adolescents.					
	Effectiveness of more versus less intensive therapies in reducing suicidal depression and behaviour in individuals with borderline personality disorder (91)	The evidence suggests both less (100 hours or less over a maximum of 12 months) and more (over 100 hours over a minimum of 12 months) intensive treatments can effectively reduce depression and suicidal behaviour in individuals with borderline personality disorder. As both types showed significant reductions in suicidal behaviour, delivering more intensive treatments was concluded to be questionable by the authors. Clinicians should be encouraged to offer the least intensive therapies for patient groups.	2013	2/11 (AMSTAR rating from McMaster Health Forum)	Not reported	6/6	6/6
	Effectiveness of interventions for alleviating the symptoms and behaviours associated with mood and anxiety disorders as well as self-harm (102)	Eight studies showed a significant improvement in depression symptoms. A meta-analysis of these results showed a reduction in depressive symptoms with group cognitive behavioural therapy. Six trials noted a significant improvement in anxiety symptoms. One trial (problem-solving group therapy intervention) measuring self-harm as an outcome observed no significant reduction from the intervention.	2007	7/11 (AMSTAR rating from McMaster Health Forum)	0/10	3/10	1/10
	Effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal ideation, both in key risk groups and in the general population (34)	The most prominent focus of the literature to date has been on pharmaceutical interventions, but the results of these studies provide few indicators of a consistent positive impact. There is evidence from a number of studies that the use of lithium in bipolar disorder may reduce attempted and completed suicide. Little evidence was identified regarding effective pharmaceutical intervention for self-harm. Some high-quality studies indicate the treatment of depression with fluvoxamine and sertraline may reduce suicidal ideation.	2006	9/10(AMSTAR rating from the McMaster Health Forum)	7/235	Not yet available	235/235

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Restrictions in access to lethal means, and service provision via specialist centres with highly trained personnel, can reduce rates of suicide. The use of individualized and intensive cognitive and behavioural therapies has shown promise in reducing attempted suicide and self-harm, with the most promising methods being cognitive behavioural therapy (CBT) and dialectical behavioural therapy (DBT). There is little evidence on the effectiveness of other non-pharmaceutical interventions for suicidal ideation.					
	Effectiveness of psychological therapies and antidepressant medication for treating depressive disorder in children and adolescents (111)	In one study, treatment by psychotherapy with follow-ups for up to 36 weeks as opposed to pharmacotherapy was shown to roughly reduce the incidence of suicide-related adverse events by half (suicidal ideation, suicide attempts). Comparing standardized suicidal ideation scores, odds of an individual on psychotherapy experiencing suicidal ideation were reduced by 74% as compared to an individual on pharmacotherapy. This effect was still seen at six to nine months. Evidence was equivocal comparing the combination of pharmacotherapy and psychotherapy versus pharmacotherapy alone. One study had results favouring combination therapy; one study had mixed results favouring different interventions if looking at suicide attempts or suicidal ideation; and one study found no difference at all. Meta-analysis of suicidal ideation scores showed no significant differences between interventions utilizing continuous data from the score, or a discrete outcome using a cut-off score. Comparing combination therapy to psychotherapy	2011	10/11 (AMSTAR rating from McMaster Health Forum)	0/10	10/10	4/10

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		alone, there was approximately a 20% reduction in suicide-related events (suicide attempts or suicidal ideation). However, from the meta-analysis of suicidal ideation scores, there was no significant difference in the odds between interventions, whether continuous or discrete outcomes were used, and regardless of the time point used between immediate post-intervention to 12 months of follow-up. Finally, the one study comparing combination therapy to psychotherapy with a placebo medication found no suicide-related events and did not look at suicidal-ideation scores. However, of five individuals presenting to emergency care with worsening suicidality, one was in the combination therapy group while four were in the psychotherapy with placebo group.					
	Interventions for suicide prevention in elderly adults (78)	Screening followed by education and follow-up by physicians reduced death by suicide in men followed by psychiatrists, and women followed-up by any physician. Telephone counselling programs have had some positive results with one study showing a reduction in death by suicide in women, but not men. In other studies it has reduced risk factors. Training physicians to provide specific depression management led to a significant reduction in suicidal ideation, but was limited to those with major depression and effects were greater in women. Treating depression reduced suicidal ideation rapidly, but in high risk groups, thoughts about death took longer to resolve.	2011	4/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Cognitive behavioural therapy over six months improved psychological health. A 16-week psychotherapy intervention in those with suicidal ideation, death ideation, or past suicidal attempt reduced suicidal ideation.					
	Suicide prevention programs for military and veteran populations (60)	Low-quality studies (observational design) make up most of the research in this area. A study looking at the combination of training with crisis reference information lacked comparison to establish effect. Training of officers in one study led to a lower rate of suicides than in the comparison group, but many confounding factors were present. Similarly, training of all service members reduced suicides in other studies. A study looking at the combination of training, guidelines, increased capacity, screening, and surveillance showed a 33% decrease in death by suicide. This effect was reproduced in another country using a similar intervention. A study looking at the combination of training, psychosocial counselling, and surveillance reduced suicides to their lowest level in a decade in the service studied, though there was no baseline rate or trend provided in the comparison, and no assessment of confounding. Psychosocial intervention for gambling reduced suicidal ideation and suicide attempts during the treatment period. The following three studies on veterans were deemed "very low quality":	2008	5/11 (AMSTAR rating from McMaster Health Forum)	0/7	0/7	7/7

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		One randomized controlled trial of dialectic behavioural therapy on veterans with borderline personality disorder reduced intentional self-harm (including suicide) by 80%. One study of veterans in substance misuse found no statistically significant difference after treatment. Treating depressed veterans with antidepressants (SSRI, non-SSRI, tricyclic antidepressants) decreased suicide rates.					
Multifaceted treatment Screening + psychosocial intervention	Effectiveness of community-based depression screening (CDS) with follow-up on the suicide risk for adults aged 65 and over (49)	The implementation of universal prevention programs involving CDS and health education is associated with reduced risk of death by suicide among older adults. However, there were very few studies included in the review to demonstrate an association between CDS and reduced risk, suggesting gender difference in the effectiveness of the intervention.	2007	4/11 (AMSTAR rating from Program in Policy Decision-making)	0/5	0/5	5/5
	Effectiveness of interventions for adolescent suicide prevention, risk factors for youth suicide, and interventions for reducing suicide in youths (71;79) *Both reviews by Pompili et al. used identical searches and have similar content, and so are summarized together.	School-based programs for high-risk students are sometimes effective at reducing psychological risk factors and improving protective factors. They may also increase knowledge of available help resources. Some studies showed the Signs of Suicide (SOS) program reduced attempted suicides by 40%, but has not had an effect on suicidal ideation or help-seeking behaviour. Studies evaluating whole-school approaches have not yielded much improvement in knowledge or attitude of students. Skills training for high-risk students has improved protective factors and reduced risk factors. Behaviour management in primary grades reduced suicidality in later years.	2008	1/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Behavioural change and strategy building for coping in the general school population decreased suicidal tendencies and improved coping. Psychosocial skill-building reduces suicidal risk (i.e. suicidal ideation and attitudes towards suicide) in adolescents, and can be mostly sustained for nine months. Gatekeeper training has consistently improved knowledge and attitudes of teachers and students trained, but there is a dearth of evidence in terms of effectiveness and harms. Gatekeeper training for teachers was affected by the baseline status of the teacher with those working with distressed youth more likely to ask about suicide consistently after training. Gatekeeper training for family, other people providing support and community members has not been effective. Parenting programs have been associated with reduction in self-harm. Screening students had low specificity and identified many false positives, even though it did have good sensitivity. Screening when tied to psychosocial therapy was effective at reducing suicidal risk factors and suicidal ideation. Postvention in this population has not shown benefit.					
	Interventions for suicide prevention in elderly adults (78)	Screening followed by education and follow-up by physicians reduced death by suicide in men followed by psychiatrists, and women followed-up by any physician. Telephone counselling programs have had some positive results with one study showing a reduction	2011	4/11 (AMSTAR rating from McMaster Health Forum)	Not reported	Not reported	Not reported

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		in death by suicide in women, but not men. In other studies it has reduced risk factors. Training physicians to provide specific depression management led to a significant reduction in suicidal ideation, but was limited to those with major depression, and effects were greater in women. Treating depression reduced suicidal ideation rapidly, but in high-risk groups, thoughts about death took longer to resolve. Cognitive behavioural therapy over six months improved psychological health. A 16-week psychotherapy intervention in those with suicidal ideation, death ideation, or past suicidal attempt reduced suicidal ideation.					
	Review of evidence of suicide-prevention programming on help-seeking attitudes and behaviours in youths (45)	Psychoeducational programs generally do not increase help-seeking behaviour. However, combining multimodal interventions with another intervention such as screening have had an effect on help-seeking in some studies but not in others. Combining pscyhoeducation with peer-help training did not exhibit an effect. Gatekeeper training in two studies did not show improvements in attitudes or in help-seeking behaviour among school students. In one study, a decrease in help-seeking from parents and peers occurred. One other study found that gatekeeper training improved securing resources for students in need. Public service messaging has had mixed results. One simulation study found no effect on help-seeking attitudes. Another study found no change in knowledge of sources of help, but did reduce	Not Reported	1/10 (AMSTAR rating from McMaster Health Forum)	Not Reported	0/19	19/19

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		perceived barriers to help-seeking and resulted in an increase in those who sought help, though not specifically for a mental health problem.					
	Suicide prevention programs for military and veteran populations (60)	Low-quality studies (observational design) make up most of the research in this area. A study looking at the combination of training with crisis reference information lacked comparison to establish effect. Training of officers in one study led to a lower rate of suicides than in the comparison group, but many confounding factors were present. Similarly, training of all service members reduced suicides in other studies. A study looking at the combination of training, guidelines, increased capacity, screening, and surveillance showed a 33% decrease in death by suicide. This effect was reproduced in another country using a similar intervention. A study looking at the combination of training, psychosocial counselling, and surveillance reduced suicides to their lowest level in a decade in the service studied, though there was no baseline rate or trend provided in the comparison, and no assessment of confounding. Psychosocial intervention for gambling reduced suicidal ideation and suicide attempts during the treatment period. The following three studies on veterans were deemed "very low quality": One randomized controlled trial of dialectic behavioural therapy on veterans with borderline	2008	5/11 (AMSTAR rating from McMaster Health Forum)	0/7	0/7	7/7

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		personality disorder reduced intentional self-harm (including suicide) by 80%. One study of veterans in substance misuse found no statistically significant difference after treatment. Treating depressed veterans with antidepressants (SSRI, non-SSRI, tricyclic antidepressants) decreased suicide rates.					
Multifaceted treatment • Pharmaceutical intervention +psychotherapy	Effectiveness of psychological therapies and antidepressant medication for treating depressive disorder in children and adolescents (111)	In one study, treatment by psychotherapy with follow-ups for up to 36 weeks as opposed to pharmacotherapy was shown to roughly reduce the incidence of suicide-related adverse events by half (suicidal ideation, suicide attempts). Comparing standardized suicidal ideation scores, odds of an individual on psychotherapy experiencing suicidal ideation was reduced by 74% as compared to an individual on pharmacotherapy. This effect was still seen at six to nine months. Evidence was equivocal comparing the combination of pharmacotherapy and psychotherapy versus pharmacotherapy alone. One study had results favouring combination therapy; one study had mixed results favouring different interventions if looking at suicide attempts or suicidal ideation; and one study found no difference at all. Meta-analysis of suicidal ideation scores showed no significant differences between interventions utilizing continuous data from the score, or a discrete outcome using a cut-off score. Comparing combination therapy to psychotherapy alone, there was approximately a 20% reduction in suicide-related events (suicide attempts or suicidal ideation). However, from the meta-analysis of suicidal ideation scores, there was no significant difference in the odds between interventions,	2011	10/11 (AMSTAR rating from McMaster Health Forum)	0/10	10/10	4/10

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		whether continuous or discrete outcomes were used, and regardless of the time point used between immediate post-intervention to 12 months of follow-up. Finally, the one study comparing combination therapy to psychotherapy with a placebo medication found no suicide-related events and did not look at suicidal-ideation scores. However, of five individuals presenting to emergency care with worsening suicidality, one was in the combination therapy group while four were in the psychotherapy with placebo group.					
Multifaceted treatment • Other combinations	Suicide prevention programs for military and veteran populations (60)	Low-quality studies (observational design) make up most of the research in this area. A study looking at the combination of training with crisis reference information lacked comparison to establish effect. Training of officers in one study led to a lower rate of suicides than in the comparison group, but many confounding factors were present. Similarly, training of all service members reduced suicides in other studies. A study looking at the combination of training, guidelines, increased capacity, screening, and surveillance showed a 33% decrease in death by suicide. This effect was reproduced in another country using a similar intervention. A study looking at the combination of training, psychosocial counselling, and surveillance reduced suicides to their lowest level in a decade in the service studied, though there was no baseline rate or trend provided in the comparison, and no assessment of confounding.	2008	5/11 (AMSTAR rating from McMaster Health Forum)	0/7	0/7	7/7

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		Psychosocial intervention for gambling reduced suicidal ideation and suicide attempts during the treatment period. The following three studies on veterans were deemed "very low quality": One randomized controlled trial of dialectic behavioural therapy on veterans with borderline personality disorder reduced intentional self-harm (including suicide) by 80%. One study of veterans with substance misuse found no statistically significant difference after treatment. Treating depressed veterans with antidepressants (SSRI, non-SSRI, tricyclic antidepressants) decreased suicide rates.					

Appendix 3 – Systematic reviews evaluating maintenance interventions for suicide prevention

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
Compliance • Ongoing contact	Effectiveness of interventions aimed at preventing suicide, suicidal behaviour and suicidal ideation, both in key risk groups and in the general population (34)	The most prominent focus of the literature to date has been on pharmaceutical interventions, but the results of these studies provide few indicators of a consistent positive impact. There is evidence from a number of studies that the use of lithium in bipolar disorder may reduce	2006	9/10(AMSTAR rating from the McMaster Health Forum)	7/235	Not yet available	235/235

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		attempted and completed suicide. Little evidence was identified regarding effective pharmaceutical intervention for self-harm. Some high-quality studies indicate the treatment of depression with fluvoxamine and sertraline may reduce suicidal ideation. Restrictions in access to lethal means, and service provision via specialist centres with highly trained personnel, can reduce rates of suicide. The use of individualized and intensive cognitive and behavioural therapies has shown promise in reducing attempted suicide and self-harm, with the most promising methods being cognitive behavioural therapy (CBT) and dialectical behavioural therapy (DBT). There is little evidence on the effectiveness of other non-pharmaceutical interventions for suicidal ideation.					
	Effects of interventions for problem drinking on injuries and their antecedents (62)	The evidence suggests interventions for problem drinking may be effective in the reduction of injuries and injury deaths, but the data is not conclusive. Three trials showed reductions in suicides after interventions (brief physician intervention and follow-up telephone call, rehabilitation program, motivational intervention) though these were small and not statistically significant. One trial reported an increase in suicide by one case after physician assessment and brief intervention for other medical issues, though this was a small and not statistically significant increase. In addition, one	2002	9/11 (AMSTAR rating from McMaster Health Forum)	1/23	1/23	8/23

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
		trial reported three suicides among 36 participants who received multi-modal behaviour therapy, whereas there were two suicides among 36 participants who received one year of psychiatry therapy. One study reported reduction of suicide attempts following telephone aftercare contacts.					
Compliance • Crisis cards	No reviews identified						
Compliance • Inpatient shelter	Psychiatric management of poor compliance of suicide attempters with aftercare, guaranteed inpatient shelter to suicide attempters, psychosocial crisis intervention, and cognitive behavioural treatment (92)	There were considerable differences in study design and therapeutic protocols amongst studies included, thus making a single pooled analysis difficult. A pooled analysis of studies on psychiatric management of poor compliance showed no significant effect on repetition of suicide attempts. Studies of psychosocial crisis intervention and studies of guaranteed inpatient shelter in cases of emergency showed no significant reduction in repeated suicide attempts. Pooled results from four studies on cognitive behavioural therapies, however, showed a significant preventive effect on repeated suicide attempts. Only the cognitive behavioural approach seems to have a beneficial effect, though due to methodological variability, the results may be too optimistic and additional research is required to establish the merits of this intervention.	1995	3/10(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	15/15
Compliance with long-term treatment • Home-based therapy	No reviews identified						
Compliance with long-term therapy • Compliance management	Psychiatric management of poor compliance of suicide attempters with aftercare, guaranteed inpatient shelter to suicide attempters,	There were considerable differences in study design and therapeutic protocols amongst studies included, thus making a single pooled analysis difficult. A pooled analysis of studies on psychiatric	1995	3/10(AMSTAR rating from the McMaster Health Forum)	Not reported	Not yet available	15/15

Intervention	Focus of systematic review	Key findings	Year of last search	AMSTAR (quality) rating	Proportion of studies that were conducted in Canada	Proportion of studies that deal explicitly with one of the prioritized groups	Proportion of studies that focused on suicide
	psychosocial crisis intervention, and cognitive behavioural treatment (92)	management of poor compliance showed no significant effect on repetition of suicide attempts. Studies of psychosocial crisis intervention and studies of guaranteed inpatient shelter in cases of emergency showed no significant reduction in repeated suicide attempts. Pooled results from four studies on cognitive behavioural therapies, however, showed a significant preventive effect on repeated suicide attempts. Only the cognitive behavioural approach seems to have a beneficial effect, though due to methodological variability, the results may be too optimistic and additional research is required to establish the merits of this intervention.					
Aftercare • Long-term therapy	No reviews identified						
Aftercare • Service restructuring and case management	No reviews identified						

McMaster University

McMaster HEALTH FORUM

>> Contact us

1280 Main St. West, MML-417
McMaster University
Hamilton, ON Canada L8S 4L6
Tel: +1.905.525.9140 x 22121
Fax: +1.905.521.2721
Email: mhf@mcmaster.ca

>> Follow us

mcmasterhealthforum.org
healthsystemsevidence.org

tinyurl.com/mhf-iTunesU
tinyurl.com/mhf-YouTube
tinyurl.com/mhf-Facebook
tinyurl.com/mhf-Twitter

EVIDENCE >> INSIGHT >> ACTION